

GOLD MINING, AND ITS MANAGEMENT—No. III.

By THOMAS CORNISH, M.E. (late of Australia).

Author of "Gold Mining: Its Results and its Requirements," "Our Gold Supply: its effects on Finance, Trade, Commerce, and Industries, &c."

Although economical mining management has been reduced to a science in Australia and America, in many of the large and well-regulated companies the knowledge of this science was not acquired all at once; but has been the result of practical experience and intelligent application as to what were the requirements of the gold mining industry to enable mines to be worked efficiently and profitably when the matrix contained only a low average yield per ton. As it was naturally to be expected the various details of a novel industry like gold mining were not mastered in a hurry, for as the gold fields developed, and the sinking of shafts on the alluvial leads or quartz lodes got deeper, and the nature of the mining operations became more difficult, so did it become necessary to improve the appliances for working and the method of conducting its operations.

Ballarat, the great gold field of Victoria and the most famous field of enterprise ever known, was the best practical school wherein to acquire a thorough knowledge of the various phases of difficult mining operations; those who have passed through the different stages of gold mining as they developed themselves on that field were enabled to acquire a more practical and intimate knowledge of mining necessary to prosecute mining works with economy than could be acquired on other fields. After the discovery of gold on the ranges and gullies in the alluvial gravels and outcrops of quartz reefs, the workings soon got deeper and more difficult from the easy dry sinking of shafts in shallow ground, as the leads or gutters got deeper with the difficulties of water to contend against, shafts had to be securely timbered with properly fitted slabs, fine gravel drifts full of water had to be carefully sunk through, and the water puddled back to keep the shafts dry, and all this heavy, and at that time dangerous, work had to be done by manual labour—no engines, pumps, or other machinery had then been introduced. The dangers and difficulties of deep and wet mining soon became apparent, and were very forcibly and fearfully exemplified by the loss of life that so often took place, most notably at a claim worked by a party of Italians, at the junction of the Gravel pit's gutter with the main lead in the Gum Tree flat. As one of the men was sinking in the shaft through a strata of black clay he suddenly struck through into a fine wet drift, and the water forced up the shaft in an immense volume, so sudden and strong was the inflow of water that the unfortunate man had no time to get into the bucket, but tenaciously held on to the edge or rim of the bucket with his hands, his mates at the windlass hearing his cry of alarm rapidly pulled him up, but when near the surface, from exhaustion or losing nerve, his hands lost their grip and he fell off into the rapidly rising water that was following up the shaft and was drowned. This shaft had struck a drift overlying a gutter that had not been previously discovered called the Gravel Pit's lead, the shaft being in a flat and about 150 ft. deep, and the source of the lead being on high ground the pressure was so great that the water rose up to the mouth of the shaft. Here was a stern reality of a truly appalling difficulty to be encountered by the many parties of miners who held claims in the neighbourhood, and only to be overcome by real hard work of water baling. The whole of the wide expansive Gum Tree flat was covered with mining claims, each 24 ft. by 24 ft., and eight men to a party, four working by day and four by night, 12 hour shifts, the shifts relieving each other at the brace. No stoppages, not even on Sundays. Hundreds of claims were occupied and worked by thousands of miners all of whom were shareholders in the several claims they worked in. Faint-hearted men or those who could not stand the heavy work at the windlass baling water 12 hours a day, seven days in the week besides having to take their turn below in the wet shaft for six hours at a time in a continual shower-bath with the extra chances of being killed through the carelessness of mates letting slabs or tools, &c., fall down the shaft, had to clear out and leave such difficult and dangerous undertakings for pleasanter fields and easier and safer work on the shallow and dry diggings. The prizes to be gained were worth the risks and labour to be gone through, but every claim was not a golden one, not even in this celebrated Gum Tree flat and Gravel Pits, which was without doubt the richest piece of ground ever opened in the world. The small areas of ground allowed for a claim at that time turning out from the first workings, amounts varying from several hundreds to several thousands per man. The Italian's claim, when the big rush of water took place from the main drift, proved to be one of the richest, as much as 40 lbs. weight of gold being washed from a tub about four small buckets of washdirt. In Noble's claim at the junction of the Bakery Hill and Gravel Pits leads about 1 cwt. of gold was washed out in a night from the rich patches found in the workings. A claim was not thought much of then, unless it went ounces to the tub, or pounds weight to the load, but after the first hurried working the same ground was worked over a second and third time by Europeans with profitable results, when with larger areas for claims and by the aid of improved appliances, such as whims and puddling machines, and afterwards by steam-power, with more economy exercised in the management, pennyweights of gold per tub, and ultimately per load of washdirt were made to pay well. These results were only arrived at through practical, and in many instances dearly bought experience. As the workings on the leads or gutters progressed westward towards the plateau on which the township of Ballarat West, the Post Office and Government Camp had been pitched, the sinking got deeper until it reached nearly 200 ft., when another obstacle to mining presented itself, in the shape of a layer of hard bluestone rock, which had to be sunk through. This obstacle like that to Mr. Biggar's marriage, was not removed by praying, but by blasting. Here was another lesson that had to be acquired by dint of hard work and well earned experience, as was often testified by the numerous accidents, many of them fatal, that were constantly taking place through inexperience and carelessness; fine gravel drifts, with lots of water, had been bad enough to fight against, but thick layers of basaltic rock, also full of water in addition was worse, and a serious impediment to the progress of mining or following the golden gutters, presented itself.

The fact had now become apparent that all the gutters or leads traced from off the Golden Point and White Horse quartz ranges, as also those from the Black Hill and Eureka, were taking a westerly course, and must pass under the high plateau on which the fine city of Ballarat West and the town of Sebastopol now stands. This meant undertaking the sinking of shafts through three or four layers of basaltic rock, as also drifts with increase of water to depths varying from 300 to 500 ft.

Then developed a new era in the gold mining history of Ballarat, and, in fact, throughout the colonies, but the same determined energy that overcame former difficulties was equal to encounter the newer and greater ones; this was in 1856. Two years before the diggers had broken out in open rebellion against the obnoxious heavy licence fees which the Government has been enforcing by armed policemen, which resulted in organising a rebel army, officered mostly by hot-blooded young Irishmen under the standard of the Southern Cross. The whole colony was in great excitement, troops were dispatched from Melbourne to quell the disturbance; this was not done till after a serious conflict with the armed diggers in the Eureka stockade on a Sunday morning at daylight, Dec. 3rd, 1854, which resulted in a sad loss of life on both sides. Many prisoners were taken, and a number of the leaders were tried for high treason, but eventually acquitted, the chief leaders escaped, and for one, General Peter Lalor, who had his arm shot off, the Government issued a proclamation, offering a reward of 5000l. for him, dead or alive. The same gentleman (an old friend of mine) instead of being president of an Australian Republic, became afterwards an esteemed member of Parliament, and now, and for some time past, has, I am pleased to say, occupied the high position of Speaker of the Legislative Assembly of Victoria, and is now the Hon. Peter Lalor, and will no doubt one day receive the honour of knighthood, the same as his predecessor, Sir Charles Gavan Duffy. As the whirligig of time has wrought changes in the actors of the scenes in those days, so has the colony prospered, and the gold mining industry developed, making gradual improvements in the means and

methods of mining, which has materially altered the aspects of the industry, and placed it on a sure and solid foundation, far beyond what it was at one time expected to attain.

DIVIDENDS PAID BY THE METALLIFEROUS MINES IN THE SEVEN YEARS ENDED 1882.

No. I.—TIN AND COPPER MINES OF DEVON AND CORNWALL. BY MR. EDWARD ASHMEAD, F.C.A.

Name.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	Total.
Blue Hills.....	—	—	—	—	500	320	—	820
Carn Brea.....	—	—	—	—	—	7,500	—	7,500
Devon Great Consols*	—	2,555	—	—	16,384	—	—	18,939
Dolcoath.....	6,981	5,907	4,296	4,296	23,628	24,165	34,905	104,178
East Pool.....	4,980	2,720	2,720	12,540	27,200	26,720	43,200	127,180
Glasgow Caradon*	5,374	896	896	—	—	—	—	7,166
Gunnislake (Clitters). ..	2,457	—	—	—	512	1,536	1,024	5,529
Holmshush.....	—	4,331	—	—	—	—	—	4,331
Kilbreth.....	—	—	—	—	—	—	3,000	3,000
Marke Valley.....	900	—	—	—	—	—	—	900
Mellanes*.....	—	—	2,500	2,500	5,500	4,500	4,250	19,250
Mulberry*.....	—	—	—	—	—	—	612	612
North Busy.....	—	444	444	—	—	—	—	888
North Levant.....	—	—	—	—	—	300	—	300
Pedn-an-drea.....	—	2,700	—	—	—	—	—	2,700
Penhall.....	—	—	—	—	500	375	—	875
Phoenix & W. Phoenix.	3,584	4,352	1,536	—	2,304	1,500	3,600	15,100
South Caradon.....	2,908	5,816	9,796	10,715	9,184	4,898	6,429	49,746
South Condurrow.....	—	—	2,700	8,437	5,850	—	—	16,987
South Wheal Frances.	6,000	3,000	—	—	—	4,500	—	13,500
Tincroft.....	—	—	—	—	4,650	3,000	2,100	9,750
Wheal Crebor.....	7,680	6,656	4,096	6,656	15,360	8,192	4,096	52,736
Wheal Eliza.....	—	—	—	—	—	2,250	6,000	8,250
Wheal Grenville.....	—	—	—	—	3,758	322	—	4,080
Wheal Kitty.....	—	4,681	—	—	—	—	—	4,681
Wheal Newton.....	—	—	2,250	5,025	15,000	3,150	600	25,025
Wheal Pevor.....	—	300	—	—	—	—	—	300
Wheal Prussia.....	—	—	—	—	1,500	6,000	4,000	11,500
West Bassett.....	3,000	1,500	1,500	—	—	—	—	6,000
West Chiverton.....	878	—	—	—	—	—	—	878
West Poldice.....	—	—	—	—	—	—	2,400	2,400
West Kitty.....	—	—	—	—	—	—	—	—
West Seton.....	—	—	450	—	—	—	—	450
West Tolgus.....	3,456	3,840	3,968	512	—	—	—	11,776
	48,178	49,698	37,152	50,781	131,830	99,228	116,216	533,088

* These are Limited Liability Companies. All the rest are Cost-Book. The net returns from ores sold by the above mines in the seven years amounted to £4,215,183. Expended as follows:—In labour cost, agency, materials, new machinery, or repairs to existing plant and machinery, &c., &c. £3,485,804. Lords' dues on net returns, calculated according to the respective rates 196,296. Dividends to shareholders as above 533,083. £4,215,183.

In a few of the above mines calls were made prior to or since dividends were declared. The amount expended on mining work would be increased by the calls so made.

GOGINAN SILVER-LEAD.—By the aid of the rock-boring machinery excellent progress is reported to be making in driving up the bottom level under the ground which in former times yielded such wonderful returns of silver-lead, and the prospects of making further important discoveries at an early date are understood to be very cheering. The manager's report for April states that the lode in bottom, or 70 fm., level is more productive than for some time past; it is yielding very good ore for the dressing-floors, and looking very promising for further improvement. In the level above (60 fm.) the lode is large and strong, being fully 12 ft. wide, of kindly composition, producing rich stones of silver-lead, and looking better than at any other part of the ground yet opened. It is stated that rich discoveries are believed to be close at hand, as, although the points for which the new levels were started have not yet been reached, a marked improvement in the lode is visible, and this has come much earlier than was originally expected. All this must be very satisfactory to the spirited proprietors, who, notwithstanding the dull state of the lead market, subscribed ample capital to give the property a thorough development. It looks very much as if their enterprise was about to be amply rewarded. Goginan was in days gone by, as many of the readers of the Journal are aware, one of the richest properties in Cardiganshire, and there does not appear to be any good reason why its famous history should not be repeated now that it is being so vigorously opened up in depth. The total sales of ore have been 25,000 tons, realising between 400,000l. and 500,000l., and it is stated that no less than 15 tons of solid silver were extracted therefrom. Goginan ore has always been noted for its richness, the percentage of silver being over 30 ozs. to the ton, and, therefore, the mine has special advantages at times like the present, when lead ore without silver is so low in price. If this property has produced nearly 500,000l. from its shallow workings above the 60, who shall say what its yield will be when thoroughly opened out in depth? All the mining experts who have examined the mine are unanimous in the belief that its future history will eclipse the past, and if that should be so it would be a happy thing, not only for the proprietors but for the famous mineral district of which it has always been the pioneer mine. The prospects are, indeed, excellent.

FRONGOCH.—Wonderful success continues, writes a correspondent, to attend the working of this famous old mine. The manager's reports for many months past have announced a continuous improvement in the upper levels, and that for the current month is of the same satisfactory character, but, if anything, more encouraging than any hitherto received. It may be fairly said that the mine never at any former period looked better or yielded more mineral than now, and if but a moderate improvement sets in in the price of metals, the profits of this company will be at once very large. The ore sales for each of the past three years have amounted to very nearly 3000 tons of lead and blende, and even this large output could be increased were the metal trade in a brisk condition. The mine has been at work without interruption for over 37 years, during which period it has sold ores to the value of 872,000l., and it is now returning larger quantities than at any former period, the sale for the present month being 250 tons of lead and blende. The points of operation in the 24 and 56 fm. levels vary in value from 1½ ton up to 5 tons of ore per fathom, and fresh discoveries continue to be made in whole ground, so that what is equivalent to a new mine is being opened up at and above these comparatively shallow points. The mine has been extensively worked to a depth of about 150 fms., and good returns could still be made from the bottom levels upon any appreciable rise in lead, as everything is in perfect repair throughout. This property, he concludes, is certainly one of the richest in the whole of Wales.

POLROSE MINE.—As will have been seen by the agent's reports, this mine is again in work, and everything working satisfactorily. In October last, whilst driving the 112 fm. level east on a very promising lode, the men suddenly and unexpectedly met with a large stream of water, which at once drove them out of the level, and rose 11 fms. in the shaft. The engine was mastering this sudden influx when a pump burst below the 90, and the water rose to the 70, from which point a side lift of pumps was dropped to the 90, but before the broken pump could be reached the second piece of main rod broke, and the water then rose to the 50 fm. level. A new piece of rod was put in and the broken pump reached, and a new one put in its place, when, shortly after, the bottom plunger failed through having been so long under water. This necessitated dropping the side lift to the 100, and after a little further delay the water was finally mastered about three weeks ago. It is only those engaged in the practical working of a mine who can realise the amount of anxiety and labour falling upon the agent and all concerned through such a series of mishaps and delays, extending over a period of five months, and arising, not from any fault on the part of the management, but solely through the heavy floods of the winter following the first misfortune of the broken pump. It has now been ascertained that the influx of water alluded to proceeded from a branch composed of flookan, mundie, and tin, which the men pricked into whilst driving the level. This branch will fall into

the lode in a few feet further driving, and as both lode and branch contain tin the result of the junction may prove of importance. Altogether the indications at this level are highly encouraging for the adventurers, and there is also a very promising lode in the shaft, which will be sunk forthwith. A discovery of tin would be of the greater value, seeing that the mine is well provided with every requisite for dressing and returning the mineral. The machinery consists of a 40-inch cylinder pumping-engine, a 16-in. cylinder drawing-engine, a 32-in. cylinder stamping-engine with 60 heads of stamps attached, extensive pitwork, besides dressing-floors, burning-house, and a large quantity of materials of every description used in the working of a mine.

THE CHANNEL TUNNEL.

The taking of evidence before the Joint Committee of the two Houses of Parliament has commenced. Sir Edward Watkin said that the tunnel would be lighted by the electric light, perfectly ventilated, and capable of carrying a maximum amount of traffic; he considered 250 trains might run each way daily; he proposes to run both good and passenger trains at 45 miles per hour, so that they would go through the tunnel in half an hour; the saving of time as between Paris and London would be two hours under the most favourable circumstances; he thought there would always remain the competition of the sea route, which would prevent any Channel Tunnel Company charging prohibitive rates; for the defence of the tunnel he recommended that there should be a great fort near where the tunnel came from the sea, and that fort, while protecting the tunnel, would be available for the defence of the harbours of Folkestone and Dover. If it should be found necessary to defend the tunnel by special works, the cost should fall upon those who made the tunnel. The fort might be made of 500,000 tons of concrete to be taken out of the tunnel itself. He considered that in the first instance the tunnel should be made by private capital, and that it should afterwards be taken over by the nation. He saw no objection to any number of tunnels being made, because he thought the more England was laced to the Continent the better. He did not, however, think it would be possible to tunnel under the Channel at any other part, as the grey chalk would be too deep. The belt through which the tunnel was going was about three miles broad, and within that area several tunnels might be made.

But by far the most important evidence was that of Sir F. Bramwell, the consulting engineer of the Channel Tunnel Company, and it was certainly not calculated to encourage capitalists. He thought that if once made the tunnel could be easily maintained and worked. For the defence of the tunnel he suggested that at the English end of the tunnel there should be a Customhouse station through which all trains must pass; that each end of that station should be protected by massive gates, and that the machinery of those gates should be such that the two could not be opened at one time. As an additional precaution, he suggested flooding, which, he said, could be effectually done in 20 minutes. The importance of this statement as a means of enabling capitalists to estimate their prospects cannot be overestimated. The facility for "sacrificing" the shareholders 10,000,000l. in 20 minutes may fail to disturb the minds of the engineers who are to participate in the professional fees to be distributed; but the flooding would probably mean ruin to thousands. It would be interesting if Sir F. Bramwell were to state what he estimates would be the cost of getting out the water, assuming the tunnel to be flooded, and what system of pumping he proposes to employ. The scheme, if sanctioned, promises to be one of the greatest jobs ever perpetrated.

PETROLEUM—NEW OIL WELLS IN AUSTRIA.

The oil region in Galicia, Austria, is gradually rising to an importance which promises soon to bring this industry and the country to European notice. On March 13 a flowing well was struck at Czarna, on the Hungaro-Galician Railway (Przmysl-Lubkow), which up to the visit of the writer last week yielded undiminished a quantity sufficient to more than fill all barrels at disposal. About 1700 are filled weekly, and the rest flows away in consequence of want of barrels. This well consists of a pit 5 ft. square and 40 metres (131 ft.) deep; then of a bore-hole in the pit 12 in. diameter, which reached without any tubing a depth of 80 metres (262 ft.), or a total depth pit and bore-hole of 65½ fathoms to the oil-bearing sandstone.

The oil rises up in the pit at the rate of 1 metre (about 80 cubic ft. of oil) per hour, and is of 35° Beaumé. As there is no distillery in the district it is carried away in carts to the railway station, and from there per rail to the distilleries in Western Galicia. The raw oil realises about 8s. per centner (100 lbs.) loco bore-hole, not including barrel. The above-mentioned bore-hole is the property of an Englishman, so that it appears that English capital and energy are going to make a peaceful but important conquest in the east of Austria. It seems that this new district is the most important in the Galician oil region, its geological conditions being the most promising of all the oil-bearing localities.

There are different theories about the oil formation of Galicia, but it would appear that it has been formed in the cretaceous strata (in the so-called "Ropianka layers"). These layers are undulating, forming saddles and troughs, which latter are filled up by the younger formation. Through the fissures of the strata in the saddles the oil rises up and fills certain sandstone layers of the eocene formation. This is the oil-bearing sandstone struck at Czarna, and up to this, where oil has been found in larger quantities, it has been in this strata; therefore, it is certain that the real oil-beds in the cretaceous formation have not yet been reached.

The strata runs with great regularity in a north-western direction; the dip is rather strongly inclined, reaching sometimes 70°. Up to the present very little geological knowledge has been brought to bear on this industry in Galicia—shallow pits have been sunk at hazard, boring with stiff iron rods and free fall chisels, mostly by hand and in a very primitive manner, has been in this stiffly inclined strata (especially where, as is nearly always the case, the bore-hole was placed in the young strata) mostly unsuccessful, as by telescoping—reducing the bore-holes—the diameter of the drills was brought to zero before any depth worth speaking of could be reached. Capital there is none in the country, therefore there are no means of working with better technical appliances. In this district three distinct eocene oil belts have been proved, but the bore-holes put down last year have not reached any great depth; they are mostly still in the Menelitz slate.

Oil in Galicia does not come under the Austrian Mining Laws, but belongs to the owner of the ground; therefore, if a bore-hole is to be put down the ground must be bought, or a previous agreement made with the owner. The bore-holes started have mostly been made on the basis of the following conditions of agreement with the ground owners:—1. A royalty of about 15 to 20 per cent. of the gross produce to the landowners.—2. A premium of about 50 fl. (say 5l.) for each pit once for all.—3. About 6 kreuzers (1½d.) ground rent per annum per square fathom for ground required for erections, &c. As there are plenty of promising oil fields still open, and to be had at above or even cheaper rates or conditions, it would be very rash if an enterpriser were to invest large sums in buying up existing mines, as with a few bore-holes and a little energy he could soon have as good or better properties in virgin ground. If a large capitalist were to take up the oil ground of the whole district to work it rationally and to bring its produce into one centre there to be distilled, this district would very probably ere long, make an effectual concurrence to the American petroleum, not only in Austria itself, but even to a large radius of Europe.

HOLLOWAY'S OINTMENT AND PILLS—INDISPUTABLE REMEDIES.—In the use of these medicaments there need be no hesitation or doubt of their cooling, healing, and purifying properties. Imagination can scarcely conceive the marvellous facility with which this unguent relieves and heals the most inveterate sores and ulcers, and in cases of bad legs and bad breasts they act like a charm. The pills are the most effectual remedy ever discovered for the cure of liver and stomach complaints, diseases most disastrous in their effects, ranging all the proper functions of the organs affected, inducing restlessness, melancholy, weariness, inability to sleep, and pain in the side, until the whole system is exhausted. These wonderful pills, if taken according to the printed directions accompanying each box, strike at the root of the malady, stimulate the stomach and liver into a healthy action, and effect a complete cure.

Meetings of Public Companies.

SAN PEDRO (CHILI) COPPER MINING COMPANY.

The adjourned extraordinary meeting of shareholders was held at the offices of the company, Winchester House, Old Broad-street, on Tuesday, Mr. S. J. WILDE in the chair.

Mr. SYDNEY A. COBBETT (the secretary) read the notice convening the meeting.

The CHAIRMAN said he was very sorry to have to state that the response of the shareholders to the circular issued after the preceding meeting (of which this was the adjournment) had been very small. The holders of 6035 shares had promised to subscribe 4s. per share, but this would only give them 1207. out of the 4000, which, after mature consideration, had been fixed upon as the minimum amount which would be required to carry out the work detailed in the circular. These offers of subscriptions included the *pro rata* contributions of himself and his two colleagues. The machinery would take at least six months to convey to the mine and erect it there, and the work proposed would take at least another year. The only course which seemed to be open was to decide upon the voluntary winding-up of the company.

Mr. DAVIDS suggested that another circular should be sent to the shareholders telling them that if they did not subscribe the company must be wound-up. A good many people would do nothing until they were threatened in that way. The CHAIRMAN said the whole of the facts had been over and over again placed before the shareholders, but of course any of them who wished to subscribe could come forward and do so between this and the holding of the confirmatory meeting. The directors had gone into the matter as closely as possible, and they were of opinion that it would be only waste of money to attempt to go on with less than 4000.

Mr. BICKERSTAFF thought the shareholders were somewhat in the dark until they knew what the debenture holders were prepared to do if the shareholders found the money to carry on the mine.

The CHAIRMAN replied that it would have been utterly useless to go to the debenture holders until they could state that so much money had been offered conditionally on their allowing the new capital to take precedence of their debentures in regard to dividend. The directors happened to know the debenture holders, one of whom was not a shareholder, and they knew that it would be useless to go and suggest a concession unless they were prepared to show what the shareholders would do. One debenture holder—who held debentures for £500—had threatened to petition the Court to order the winding-up of the company if his interest were not paid, and the directors had had to pay his interest under an indemnity that they would be held harmless.

A SHAREHOLDER asked if it was a fact that natives had been working at a profit on parts of the property?—The CHAIRMAN, in reply, said some small profits had been made by tributers, but, of course, the company had had to bear the expenses of keeping the mine free from water and the other establishment charges.

Mr. BICKERSTAFF remarked that the mine was to have made a profit of at least 5000, a year, and it was described not as a speculation but as a certainty, and yet Cape Lean and Dr. Sieveking spoke of matters of probability and speculation. The whole thing seemed to him very unsatisfactory.

The CHAIRMAN pointed out that Mr. Bickerstaff had referred to the early and late history of the mine, but he had left out of consideration the middle history of the property. It was true that Mr. Waters derived a large sum of money from the working of the mine—in one or two years as much as 50,000, per annum, but the mine fell in, and a large sum of money had been spent in trying to get under solid ground, where the mine had been worked before. A company (with which he was not connected) was formed to sink the shaft and get underneath the old ground, looking upon the success of the operation as a certainty, but instead of finding the lode in the state which they expected to find it was found to be disordered, and that company lost all its capital, and went into liquidation. The present company was afterwards formed as a pure speculation, to put the shaft in order and sink lower. The lode was still disordered, and the reason why more money was asked for was to enable them to get through the disordered ground with the view of reaching a paying lode.

The CHAIRMAN, after some discussion, moved "that the San Pedro (Chili) Copper Mining Company be wound-up voluntarily."—Mr. WALTER J. COBBETT seconded the motion, which was carried; and on the motion of the CHAIRMAN, seconded by Mr. DAVIDS, Mr. S. A. Cobbett (the secretary) was appointed liquidator.

Mr. O. J. LEE proposed "That the shareholders present urge upon their fellow shareholders the necessity of their responding to the circular of the directors to pay 4s. per share in the instalments and upon the terms therein mentioned, as in the event of the money not being forthcoming the company will be absolutely wound-up."—Mr. BICKERSTAFF seconded the proposition, and it was carried.

A vote of thanks having been passed to the Chairman, the meeting closed.

CESENA SULPHUR COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, Finsbury-circus, on Monday,

Mr. CHARLES SCHIFF in the chair.

Mr. R. LARCHIN (the secretary) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, this is an extraordinary meeting to which you have been called in consequence of the financial situation of the company. As you are aware, for years past Messrs. Geisser, in Turin, have supplied the necessary funds for the working of your property. Their account current has swelled very considerably in consequence of the unfortunate result of the mine's working, and it has now been pressed upon the directors to get their credit in the account current practically consolidated in the shape of a mortgage on the property, this mortgage being a second mortgage. You are aware that the company has already granted a first mortgage on its property for a previous loan, into the history of which I need not go at present. But before I put the resolution I think it right that I should give you some account of the condition of your business. Mr. Kossuth, who still continues to be the managing director of the concern, has written a long report, and, unfortunately, this report only reached us late on Friday, and it was impossible to circulate it in time for the shareholders to receive it for this meeting, but I will now give you some extracts thereof, or if you prefer it I will have it read in *extenso*. Of course, the only business which we ask you to vote upon is the resolution of which notice had been given.

A SHAREHOLDER suggested that a *résumé* of the report would be sufficient.

The CHAIRMAN: Mr. Kossuth reports that the year 1882 has been the most unfortunate that he has had during his management of the property. He further says that the mine has become extremely reduced (barely 3 to 4 ft.) in thickness, and this reduced thickness was interwoven with barren plate. He then says: "These difficulties, however, were far from being the only drawback we had to contend with. Our endless chain plant met with a whole series of accidents which had never occurred previously, on the contrary, it had been the main support of our works, without which our mine would no more have been worked." One of the reasons why it broke was that during the last four months there had not been a sufficient sum devoted to the maintenance of the gear as perhaps he might have wished, and, in fact, he says "we had not more than one spare chain for our first transmission underground, and not more than three spare chains for our transmission through the shaft." However, after giving the details of all the amount of trouble and interruptions he had to go through, he now says that he has been able to place the whole of the gear underground, and that in this way he hopes to be able to work it more efficiently and with less accident. Then he says he is driving a gallery "to search the limit of the extensive workings of past centuries had reached so far as to enable us, with a short and speedy work to communicate with it from the point where the inclined planes of the endless chain ginney begin underground, which is at 224 ft. from the bottom of the winding-shaft, this shaft being during the winter season the upcast." So he got a supply, and he has been able to go on and do his work. He also wants "to guard against idle and unjustifiable criticism," by saying that he has very much considered the question of working by compressed air, and he gives his reasons why that was not possible. Then he says: "Our mine is in a part of Italy in which murders are very frequent." In consequence of these murders the working was interrupted for two or three months until the men signed an address of submission; the notorious rogues were excluded, and the work now goes on more peacefully. Then he reports that the output has been 53,411 tons of mineral, from which 6235 tons of sulphur were produced. He then gives them the particulars of the cost of production and the cost of refining as well as the selling prices as a medium, which varied for different qualities from 111 lire to 130 lire. I would remark that this is a little improvement on the prices we have had, and so far it is pleasing to hear at least one small feature in our favour. He then speaks about the result shown by the balance-sheet, which, by-the-by, has not yet been examined, audited, or verified, and therefore, I give these figures with the most reserve for future examination. This balance-sheet shows a loss of 12,303, 16s. 10d. He goes on to speak of the general position of the company and goes as far back as 1875, and says that at that time the company borrowed 40,000, on onerous terms. You know all the particulars of that operation. He then says that "as to now, circumstances seem to have belied their hopes and also mine personally, which, though ever far from being sanguine, did certainly lead me to expect to show a better result than 12,303, loss, on the year's working." He says there is plenty of room left for hope yet, but at the same time he calls attention to the position in which we are placed by owing such a large amount to our bankers. He is in favour of doing what Messrs. Geisser ask—to grant them a second mortgage on the property, and these are his arguments—that "as the shareholders lose nothing though we may work at a loss, it is advisable to go on; if not, it would have long ago have been advisable to stop. Things may better, and there is no reason why they should not better, as in mining there are often ups and downs. The scam may retain what it was, and there is no local reason against it, the endless chain difficulties arisen in 1882 (and never before) have been done away with and every month passing, makes us more completely masters of the difficulties owing to boiler and engine underground in eminently unsuited geological formation; prices may rise, and so on. Having made an invocation that we should grant this mortgage, he says:—

"The meeting to which this report will be submitted will be convened for the purpose of deciding whether a second mortgage should be given to Messrs. Geisser. I am unable to attend this meeting being quite unable to leave Cesena and the company at present, but if I were present I would vote for the affirmative. The reasons of my vote are apparent from what I have already written, and what I may recapitulate, stating, that compliance with Messrs. Geisser's wish is the only way in which it is still possible for us to go on; that, by going on, even if it were at a further loss, this company and the shareholders cannot lose anything more than what they would lose hopelessly if we stopped; that a bettering is still possible, therefore, simply common sense tells us to leave a door open for it as long as we can. My conviction that bettering is still possible, is so firm that I have been helping with my own money this company,

to keep life in it and urge it on towards the proverbial corner which we see plainly in front of us and through reasons superior to human will and ability we are unable to turn." In conclusion, he says—"From the commencement of the year the provisional balance-sheets show no loss, and, in fact, look as if they promised better than we have seen. Well, gentlemen, I am sure that if they report, which, as I have told you, has nothing much to do with the present question before the meeting, but as it was forwarded to us by our managing director, on whom rests the whole responsibility of the management of your property, I thought it would be a fair thing that I should read some extracts from it, not having had sufficient time to circulate it before the meeting was held. Therefore, I have now only to move the resolution which has been read:—"That the directors be authorised to create in favour of Messrs. U. Geisser, a second mortgage charge upon the properties of the company, in security for the indebtedness of this company to the said U. Geisser, in such form and under such conditions as the directors may determine."—Mr. J. J. LYON seconded the motion.

Mr. EDENSON thought it would have been desirable that the shareholders should have had from the Chairman some comments on the report presented by Mr. Kossuth, and suggested that before the shareholders came to any determination on the resolution before them they should be in possession of the balance-sheet. The mortgage seemed to be asked for as security for further advances, which would give the mortgagees power to foreclose at a period which might be one of greater difficulty for the company than even the present time. They should also have some time to consider the report. It was gratifying to find that the present working was of a more favourable character.

Mr. DEACON remarked that Messrs. Geisser had already advanced the money, and if they did not obtain a mortgage they had the power of stopping the work at the mine, which would place the company in a worse position than it was now in. Perhaps a little delay might not injure the position of Messrs. Geisser, and it might enable the shareholders to have matters placed more clearly before them.

The CHAIRMAN, in reply, said he had never kept anything from the shareholders whether favourable or the reverse. Unfortunately, during the last 12 months there had been nothing to recoup them for their losses, and they owed the bankers of the company in Italy something like 40,000, and they were clamouring for security. The balance-sheet could not be prepared and audited for a few weeks as the books had not yet been received from Italy; but the draft balance-sheet could be examined by any of the shareholders. To defer the present meeting would not advance the matter at all, but the resolution if passed would have to be confirmed at a subsequent meeting, and the directors were being well advised with the view of protecting the interests of the shareholders in every possible way. (Heard.) The first mortgage was for 40,000.

Mr. EDENSON having expressed entire confidence in the integrity and ability of Mr. Kossuth, the motion was put and carried unanimously.

The meeting closed with a vote of thanks to the Chairman.

PANULCILLO COPPER COMPANY.

The twentieth ordinary general meeting of shareholders was held at St. Michael's Hall, George-yard, Lombard-street, on Tuesday,

Mr. JOHN PENDER, M.P., in the chair.

Mr. J. S. ALEXANDER (the secretary) read the notice calling the meeting, and the report and accounts were taken as read.

The CHAIRMAN said: Gentlemen, before asking you to approve of the report and accounts I will just review the last year's work, and also refer to the general position of the company at the present time and during the last ten years. In the year 1882, 57,864 tons of copper ore were smelted at Panulcillo; 7288 tons of coke, and 3906 tons of coal were consumed in the furnace operations there. The Chili costs amounted to \$840,498.96, as follows:—Copper ores \$391,598.11, fuel \$186,540.22, sundries—loss in exchange \$98,277.34, general charges \$53,358.12, sundries \$110,724.57, together 262,360.63. In the year 1882, 6272 tons of regulus, containing about 2924 tons of copper were produced at Panulcillo, which realised \$1,077,018.16; the net Chili profit was \$236,519.20. Of the Chili costs (\$840,498.96) \$263,500 was spent in salaries and wages in the year 1882. In proportion to the quantity of regulus produced this cost of \$263,500, was equal to 42s. 6d. per ton, and the wages charged in the accounts submitted to the last meeting, attributable partly to effective use of machinery. Upon the same basis of comparison the fuel used in smelting, 6276 tons of regulus in 1882, cost about \$20,000, less than in the previous half-year, arising from cheaper cost and better work. The carbonate ores used in 1882 cost about \$10,000 more, on the basis of copper contents proportionately, than in the previous financial period. The stone-crusher has been found so useful that a second machine of the same size and description has been ordered, and will be sent out at the earliest opportunity. It is hoped that the rock-drill will be in operation by this time. I may mention that we are using machinery so as to economise labour, and as far as it has gone it has been a great success with the crusher. I hope by this time the drills are at work, which will economise labour to a very important degree. The loss in exchange was less in 1882 than for some time past (say) \$98,277.34 as compared with \$59,912.21 in half-year ended Dec. 31, 1881, \$146,510 in the 12 months ended June 1881. On reviewing the operations of the last 10 years it will be seen that 445,000 tons of copper ore have been extracted from the Panulcillo Mine, or an average annual output of 44,500 tons, which was exceeded in the year 1882 when 46,617 tons were extracted. I think we have now come to a point at which we are not only paying but are likely to pay good dividends. I think it is right I should call your attention to what we have been doing during the past 10 years. Although we have not during the whole time paid a dividend to the shareholders, yet we have wiped out a large amount of debt. I wish to draw your attention to this more particularly, not because we have been successful during the past two years, but because we have been in years gone by more or less of an unsuccessful mining company, but by economies and a better system at the mines I think we have now a firm grip of the thing that we are doing, and our prospects are exceedingly good for the future. (Cheers.) The profit realised from Panulcillo operation during that period of 10 years has enabled the board to wipe out the balance of debtor of profit and loss account of \$7,515, to distribute among the shareholders for the past three years dividends (including one now going out) of 65,000, being equal to a return of nearly one-third of the company's capital of 200,000, and there remains an undivided profit on hand of about 10,000. (Cheers.) It is important to observe, too, the great improvement in the company's financial position achieved in the period referred to. In the year 1875 the company's capital was £100,000, and bearing interest at 10 per cent. per annum; these have since been all paid off, and the company's indebtedness on debentures will on May 15 be reduced to 32,000, issued at par, bearing interest at the rate of 8 per cent. The incidence of the latter change, as compared with the former upon the respective amounts borrowed represents an annual saving to the company of about 4½ per cent. on the capital of 200,000, and available to that extent for improvement of dividends to the shareholders. It may be observed that notwithstanding the large extraction of ores before alluded to the resources of the mine seem inexhaustible, and the uncovered reserves were estimated in January last at precisely the same quantity as in July, 1874, say, 600,000 quintals, an amount which exceeds a year's smelting requirements. (Cheers.) For instance, 494,000 quintals were extracted in the year 1882. It may, perhaps, be considered unnecessary to burden the present with the expense of opening out provision for a remoter future than a year, seeing that the Panulcillo Mine, to all appearances, is practically as inexhaustible as ever. (Cheers.) The completion of the San Gregorio tunnel after many years work, and an extended use of machinery as a supplement, and in some degree substitution of the cost of production or the cost of copper in the market. Copper at the present moment is very low indeed. I remarked at the last meeting that it was so low that it was impossible to go lower. It has improved a little, but a very little indeed; but let me assure you that copper at the present price is very satisfactory to us, and I am hopeful that with the economies I have just pointed out to you, the fact that we have over 12 months' coke for smelting purposes on the way and paid for, that we have not yet realised the advantages which we are to realise in the way of economy from the rock-drill, and looking to the fact that this mechanism is likely to give us a more steady production from our work—looking at these facts I feel satisfied that even with copper at the present price our prospects are very encouraging indeed. (Cheers.) If copper should advance by 5s., 7s., or 10s. per ton, and there is nothing more likely, we should be in that much better position; therefore I have very great pleasure in asking you to approve of the report which I have put before you. I will move that the report and accounts of the directors submitted to this meeting be and the same are hereby received and adopted, together with the recommendation of the board that a dividend free of income tax be and is hereby declared of 6s. per share upon the shares of the company, making with the interim dividend of 6s. per share paid on Oct. 10 last a dividend of 12s. per share free of income tax for the year 1882, or at the rate of 15 per cent. per annum. (Cheers.)

Mr. F. J. JOHNSTONE (deputy chairman) seconded the motion, which was put and carried.

The CHAIRMAN: As I have mentioned, gentlemen, economies have been effected, and we have at our board men who thoroughly understand the copper trade, and are well acquainted with its production. Two of those gentlemen retire to-day, and I have very great pleasure in proposing, in the first instance, that Mr. Alphonse Henri Berthoud, one of the directors retiring by rotation at the present time, be, and is hereby, re-elected a director of the company.

Mr. F. J. JOHNSTONE seconded the motion, which was put and carried.

Mr. BERTHOUD: I beg to thank you, gentlemen.

The CHAIRMAN: The next resolution is that Mr. Frank Walters Bond, who retires by rotation, being eligible, be, and is hereby, re-elected a director of this company.—Mr. JOHNSTONE seconded the resolution, which was carried.

On the motion of Mr. W. W. WOODWARD, seconded by Mr. COOPER, the auditors—Messrs. Harding, Whitney, and Co.—were reappointed.

Rev. AUGUSTUS COOPER said he congratulated the board and the shareholders upon the best report which had ever been placed before one of these meetings. This was almost the first meeting he had ever attended in the City at which no cantankerous shareholder had any remark to make. He asked the Chairman whether he could hold out any hope of any rise in the price of copper?

The CHAIRMAN: Well, you ask me a question which it is very difficult to answer. I can only refer to what is passing before those who know something of the copper market. We have the great power—electricity—coming forward very rapidly, and electricity requires for its conduct copper.

Mr. COOPER: That is one reason why I asked you.

The CHAIRMAN: Therefore I cannot suppose but what the consumption of copper in that direction will very largely increase. There are other things at work in which copper is very largely used. I suppose ship-building was never more active than at the present time, and there are very large quantities of copper used in the internal fittings of steamships; and altogether, if I were to give an opinion, I should say, looking to the production of copper, and know-

ing, as compared with what the production of copper was 15 years ago, at which time many people were frightened that the production of copper was going to swamp everything, we have now copper at a low price, and low prices introduce copper where it has not been used before, and have opened up a new market for it; therefore, gentlemen, I cannot but come to the opinion that there is a very grand future for the consumption of copper, and a very brilliant future for its prospects. (Cheers.) Gentlemen, a resolution has been put in my hands which I have the greatest possible pleasure in proposing. We may do a great deal on this side of the world, and arrange the best laid schemes and plans, but unless we have intelligent and honest men to carry them out our schemes and plans may come to nothing. I believe at the present moment we have the most efficient and most thoroughly honest combination of management at the mine, and I think the results show so far in the economies which have been exercised. (Cheers.) I have the greatest possible pleasure in moving that the best thanks of this meeting be and is hereby given to the manager and officers of the company at Panulcillo for their valuable and successful services to the company during the past year. (Cheers.)

Mr. WHITLEY said he had the great pleasure in seconding that. He was sure the shareholders had to thank the Chairman for the able *résumé* the Chairman had given of the progress and position of the company. He would not say more, but simply call attention to the third paragraph on the last page in the Chairman's report, which well deserved the attention of every shareholder.

The resolution was carried.

The CHAIRMAN said that concluded the business, and he could only hope that they might have as great an increase to report at the next meeting as he had in the past.

On the motion of Mr. WHITLEY, seconded by Mr. W. ORBY WOODWARD, a cordial vote of thanks was passed to the Chairman and directors.

The CHAIRMAN: On behalf of my colleagues and myself I can only say that looking at the long years, the very long years, we have been associated with this concern, and standing by it as we have done, it is a very great satisfaction to be able after some years of adversity to declare a dividend which we have declared to-day. We shall be unremitting in our endeavours to place the Panulcillo Company in the highest rank of dividend-paying companies. (Cheers.)

The meeting then broke up.

THARSIS SULPHUR AND COPPER COMPANY

The annual general meeting of shareholders was held at the Merchant's Hall, Glasgow, on Wednesday,

Mr. CHARLES TENNANT, M.P., in the chair.

Mr. THOMSON (the secretary) read the notice convening the meeting, and the usual preliminaries having been disposed of the report and accounts, abstracts of which were published in last week's *Mining Journal*, were taken as read.

The CHAIRMAN congratulated the shareholders upon another year's satisfactory results, and, in the course of a lengthened speech moving the adoption of the report, said:—Our ore is coming home richer than it has been for some time past, and this improvement in copper contents will, we have reason to believe, continue. The price of sulphur remains the same as I have said—6d. per unit. In the production of precipitate on the mine we look for a considerable increase. The price of copper has given way of late, but we are inclined to think that we shall see a recovery ere long, as there is nothing that we can see in the position of the article to warrant the recent fall. Our sales up to this date have been considerable, absorbing our stocks at the end of the year, and the production up to the end of March, and at prices very much the same as those of last year, and we think it probable there will be no great difference in the average price of the two years. Of iron ore we have sold about two-thirds of our probable output, and at prices rather over those of last year. Exports will again be somewhat low, but our deliveries will depend upon our consumers, who may not see their way to using their usual quantity, but up to this date there is no appreciable falling off in their demand. Our supplies of cinders to our metal works may fall rather short, and this is the only point in which we fear this year may contrast unfavourably with the last. I think, therefore, that, on the whole, we may look forward with confidence to the results of 1883. Fortunately for the Tharsis Company, our customers are amongst the most important in the alkali trade; and, although a number of makers have abandoned the business rather than carry it on as they have been doing, at a serious loss, ours goes on manufacturing, hoping that some beneficial change may ere long take place in the position of the great industry. I brought the whole question before you at some length in my address last year, to which I beg to refer you. We can look forward to a moderate reduction in the price of sulphur without anxiety, as if we keep our plant on the mine, our railway and our metal works fully employed, we shall, in my opinion, have a considerable margin of profit to come and go on before materially affecting our dividend. I cannot help thinking that when the time arrives for dealing with the important question of the future price of sulphur we shall not find in finding a solution which shall be mutually satisfactory alike to the alkali trade and this company.—Mr. SCHAW seconded the motion.

Mr. W. A. SMITH understood that the Chairman had received that morning a very respectfully worded request regarding the dividend. That request, to which he was a signatory, was made, not with the view of asking the directors to change their opinions or to change the dividend. It was intended as a protest thus far, that the time had arrived when the excessive depreciation and retention of profits ought to be, at all events, reconsidered. He was sorry that the Chairman had not mentioned the matter, because it would have reassured the signatories that they had in view to propose a larger distribution of the profits. As to the 7000 or 8000 unused shares, he thought these shares might very safely be retained till after next annual meeting, as, so far as he could see, they did not require his money.

The CHAIRMAN: I have stated most distinctly that these shares will not be dealt with in any way whatever until we present ourselves before our shareholders again. He continued, that they propose to pay debentures out of the reserve fund, which, in the meantime, they were strengthening.

Mr. SMITH remarked that in September or October, long before the debentures fell due they must be accumulating profits for the current year. These profits they invested at 3½ or 4 per cent., and with all deference to the views of the directors he thought that so soon as the money was earned the shareholders should begin to get it to invest for themselves. He thought this might be accomplished by the creation of 5 per cent. preference shares.

The CHAIRMAN said that, with regard to the debentures, Mr. Smith seemed to be under a delusion. He seemed to think the directors had power to pay off the debentures at any time when they had money in hand. The debentures, however, only fell due in 1885, and they could not be redeemed at that time, unless the holders came forward and asked them to be redeemed. The directors had always told the holders that they were at all times willing to redeem the debentures, but he was sorry to say very few of the holders had made application. Under these circumstances he thought the course the board was pursuing the only wise and safe one to pursue.

A long and somewhat angry discussion as to whether the officers of the company trafficked in the company's shares followed, in the course of which the Secretary declared that he had not dealt in shares since the formation of the company in 1865, and the Chairman denied that any director had dealt upon information not equally at the disposal of every shareholder. The retiring directors and auditors were subsequently re-elected.

The CHAIRMAN moved the adoption of a resolution providing for the sub-division of the existing capital of the company into 625,000 shares of 2s. each.

Mr. SCHAW seconded the motion.

Mr. ALEX. DREW suggested the consolidation of the stock, transferable in amounts not lower than 1s. By such a course the allocation of any fresh capital they might wish to raise would be more easily accomplished.

The CHAIRMAN said that Mr. Drew's suggestion could not be considered at that meeting, and he afterwards explained that what the directors had arranged was to issue on Aug. 1 shares to bearer of 2s. each. The shareholders would have the option of converting their nominative shares into shares to bearer, and they could have the option of reconverting them at any future time into nominative shares. Coupons for 12 years would be attached.

The motion was adopted, and the proceedings terminated with a vote of thanks to the Chairman.

CWM DWYFOR AND BRYNARIAN MINES COMPANY.

The first ordinary general meeting of shareholders was held at the offices of the company, St. Clement's House, Clement's-lane, on Thursday, Mr. CHARLES BARTON, J.P., in the chair.

Mr. G. J. GRAY (the secretary) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, as you are aware this is the statutory meeting of the shareholders, and the directors are glad to have the opportunity of stating what they have done towards the development of the Brynarian Mines. At the Cwm Dwyfor Mine, where there exists what seems to be a valuable deposit of rich copper ore, nothing had yet been done, but judging from the large quantity of copper ore raised from the neighbouring mine there was good reason to suppose that with the present price of copper the Cwm Dwyfor Mine would pay. At the request of the directors, Mr. F. B. Henderson, the consulting engineer of the company, had last week visited both the Brynarian and the Cwm Dwyfor properties, and they had that morning received his report.—The SECRETARY then read the subjoined report.

April 25.—Brynarian Mine: On April 16, 17, and 18 I carefully examined and detailed the work now in progress in Joseph's level and the 29 north, Pensarn level, and now beg to hand you my report.—Joseph's Level: Since the new company commenced work this has been driven south 10 fms. on the course of Joseph's lode; for the last fathom or two the lode has become nearly perpendicular and is bearing more to the west, which indicates that it is nearing some powerful influence, presumably the Brynarian lode. I searched diligently to find the back or outcrop of this Brynarian lode at surface, south of the present end of the level, but there is so much drift deposit overlying the solid rock at this point that it is impossible to trace it, although the outcrop of a very powerful lode is to be seen in the stream about 50 fms. to the west. The indications of the lode here are of so marked a character that it is reasonable to suppose that a strong lode will be cut by the extension south of Joseph's level. A sparry band has made its appearance, crossing the forebore of the level, which is possibly a leader of the lode you are in search of. The water-blast arrangement I recommended for the purpose of ventilating this level has been erected and answers its object well. The level is being driven by four men at the rate of 2½ fms. per month.—Pensarn: The 29 has been extended to 10 fms. north by the new company, and has recently crossed a lode which seems from its dip and bearing to be either Morgan's or a parallel lode. I think it would be advisable to drive a few fathoms westward on this lode to prove it. In the roof of the 16, on the No. 1 east and west lode, there is some lead standing, of which I broke samples; former workers must have had paying ground here, and I am disposed to think it would be to the advantage of the company to put men to stop in this level. There is, however, another point in your property of great geological interest to which I wish to call your attention—the discovery of a cross-cut south from the end of the level driven eastwards from Boundary adit, by driving

astward on the Brynarian lode when intersected by the cross-cut you will unwater the old workings which appear to have yielded large returns of rich lead ore. The district is highly mineralised, and I believe the further vigorous prosecution of work in your property will be rewarded with success.

Owm Dwyfor Mine: I visited this property on the 19th and 20th inst., and from examination of the outcrop of the strata I believe, taking into consideration the geological age of the rocks in which the lodes are embedded that they will be productive of copper in depth. As the shafts and workings in the southern portion of the sett were full of water I was unable to examine the lodes there. In the northern portion I found three copper lodes cropping up to surface, which have been driven through by a level from the hillside, but as this level has fallen in I could not examine them where driven through. I found, however, some stoping had been done from surface on the most northern of these lodes, which is about 5 ft. in width, and samples of this lode I obtained from the sides show copper ore of good quality. I understand that this lode where driven into by the level promised well, and was over 30 ft. in width. I consider this point on your Owm Dwyfor property well worthy of a trial. The level referred to should be cleared and retimbered when you can at once proceed to stop the lode and prove its value. I understand that samples from this lode showed 20 per cent. of sulphuret of copper, besides 14 ozs. of silver per ton of ore. I may mention that Symde Dylluan and also Drwa-y-coed Mines to the north on parallel lodes, and in strata of the same geological horizon have been very productive, and this should encourage you to make the trial I recommend which is likely to be attended with success.—F. B. HENDERSON, C.E., F.G.S.

Gen. COLE said he came to the meeting to learn the position of the workings, and he was satisfied with the report just read, and was sure that the directors would keep the shareholders informed as to the progress of the undertaking, so that before another call was made they might exactly understand what their prospects of success were. He had every confidence in the board.

Mr. MAW (director) said the directors had a considerable stake in the company and the shareholders might rest assured that their interests would be well looked after.

Mr. HENDERSON, F.G.S., said he was impressed with the value of the property, and he would direct particular attention to a point not yet touched—the unwatering of the old Brynarian workings, where the lode gave large returns of rich lead ore, and this could be done by driving a cross-cut from the boundary adit.

On the motion of General COLE a hearty vote of thanks was given to the Chairman.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CCXV.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,

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MECHANISM FOR ACTUATING THE MAN ENGINE.

The power for driving the man engine is usually obtained from a steam engine or from water wheels. With a steam engine the main rods may be connected either direct to the piston rods, or indirectly from a rotating shaft or crank; this latter is always the case when the power is derived from a water wheel. The mechanism for actuating the man engine may, therefore, come under one of two kinds—direct transmission, or indirect transmission, from a rotating shaft or crank; we shall consider the latter first. In the case of transmission from a rotating shaft or crank moving at a uniform speed, the motion of the main rods is that of a rectilinear motion derived from a uniform circular motion. The velocity, therefore, varies from 0, when the crank is passing over the dead points, to the circumferential velocity when the crank is at right angles to the connecting rod; this motion is practically the best for man engines, since the rods are moving slowly towards the ends of the stroke when the miner requires to change from one foot board to the other; and, moreover, the velocity towards and from the middle of the stroke increases and decreases gradually. Let us suppose, for example, that the stroke of the main rods is 10 ft., derived from a 5 ft. crank rotating uniformly with four revolutions per minute, and imagine the circle described by the crank divided into 20 equal parts; the crank passes over one of these in three-quarters of a second. If we follow the corresponding motion of the main rods, and compare the distance moved through by the rods in successive three-quarter seconds commencing from one end of the stroke, we find that in the

First $\frac{3}{4}$ of a second the rod moves through ...	2.934 inches
Second " " " "	8.526 "
Third " " " "	13.272 "
Fourth " " " "	16.728 "
Fifth " " " "	18.540 "
Sixth " " " "	18.540 "
Seventh " " " "	16.728 "
Eighth " " " "	13.272 "
Ninth " " " "	8.526 "
Tenth " " " "	2.934 "

Or in $\frac{7}{8}$ seconds moves through..... 120 in. = 10 ft.

During the last three-quarter seconds of one stroke and the first three-quarter seconds of the next, or for one and a half seconds, the foot boards in the case of double-acting man engines are within 6 in. of each other; one and a half seconds may be considered as ample time for stepping from one rod to the other. In the case of single-acting man engines the distance of the moving foot board from the fixed foot board is under 3 in. for the same time. The motion is most generally transmitted from the rotating crank to the main rods by means of cross levers, the ends of which are connected the one to the main rod and the other to the crank pin by means of connecting rods. In the first man engines erected in the Harz Mines horizontal levers with sectors on the adjoining ends were employed. To the upper ends of the sectors chains were attached which passed downwards to the upper end of the main rods.

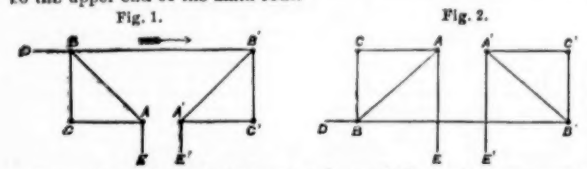


Fig. 1 shows the most frequent and one of the best arrangements of the cross levers. In this D is the connecting rod attached at one end to the rotating crank, C B and C A, and C' B' and C' A' are the cross levers which oscillate about C and C' respectively. E and E' are the connecting rods attached at their lower ends to the main rods of the man engine. In order to throw as little side pressure as possible on the top guides of the main rods, these connecting rods should be made longer; the shorter the arms C A and C' A' to which they are attached. Where these connecting rods are from two and a half to three times the length of the stroke the length of the arms, C A and C' A', should about equal the length of the stroke. The length of the arms, C B and C' B', is usually taken at from three-fourths to the same length as the arms, C A and C' A'. The ratio of the length of the C B and C' B' to that of the arms, C A and C' A', is the same as that of the length of the crank to half the length of the stroke of the main rods, where, as is usually the case, the arms, C B and C A, are at right angles to one another. The smaller the length of the arms, C B and C' B', so much the greater is the side thrust on the bearings at C. The position of the centres, C and C', should be such that the prolongation of the centre lines of the main rods bisects the versed side of the arcs described by the ends A and A'. The arms, A C and A' C', are constantly under a compressing force, which is least when the main rods are at the bottom of their stroke, and this force gradually increases until the tie rod, A B, becomes horizontal when it reaches its maximum value; should the upstroke be not completed before this, which is usually the case, the compression begins to diminish. The tie rods, A B and A' B', are under a continual tensional force, which is greatest when the main rods are at the middle of their stroke—i.e., when the connecting rod E is at right angles to the arm, C A. The levers, C B and C' B', are under a compressing force, which is greatest when the main rods are at the bottom of their stroke, and from this point gradually diminishes until the tie rods become horizontal, when it is 0; should the upward motion be continued the force becomes tensional. The connecting rod, B B', when the man engine is stationary, is compressed by a force equal to the strain on one of the connecting rods, E, multiplied by

the length of the lever, A C, and divided by the length of the lever, B C. When the connecting rod, B B', is moving in the direction indicated by the arrow, this compression is increased by the thrust of the connecting rod, D, and when moving in the opposite direction this compression is diminished by the pull in the connecting rod, D. The above considerations will indicate the various positions in which the separate parts of the cross lever arrangement are subjected to the greatest strains, and for which the corresponding strength of the various parts must be calculated.

Fig. 2 shows another usual arrangement of cross levers, which may be considered to be Fig. 1 inverted. The strains are for the same dimensions of the cross levers and weight of rods, &c., the same as in Fig. 1, though all the strains are in the opposite sense—i.e., the parts which in Fig. 1 are under compression in Fig. 2 are under tension, and vice versa; with this arrangement, however, the cost of the foundation or supports for the bearings, C and C', is greater than in Fig. 1. Where single-acting man engines are employed the cross levers may have an ordinary L or J arrangement with tie rods, the connecting rod from the rotating crank being connected to the end of the vertical lever.

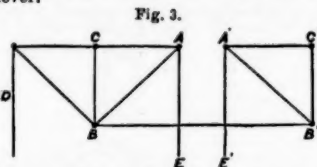


Fig. 3 shows the lever arrangements of the man engine at the Gewalt Colliery, near Steele, in which the connecting rod D is vertical. Unless the levers are specially balanced, the rod E has a tendency to make the downstroke quicker than the rod E. The balancing may be effected by weighting the lever to which the rod E is attached, or by placing counter balance weights in the rim of the disc crank actuating the man engine. This arrangement has the advantage of being compact, and the driving engine may be placed near the shaft; but foundations for carrying the levers will have to be carried up some height above the ground, and prove expensive. Several proposed arrangements for the mechanism employed in transmitting the power from the motor to the main rods have as a special aim to allow of a pause at the end of each stroke, during which the miner can step from one foot board to the other.

In the arrangement suggested by Guibal the upper ends of the man engine rods are attached to two piston rods, the pistons of which work in two vertical cylinders. Behind these is a horizontal cylinder, the ends of which communicate respectively with the bottom of the two vertical cylinders. The piston rod of the horizontal cylinder passes forward, and forms the piston rod of a steam engine cylinder. The piston of the horizontal cylinder forces water during the forward and backward strokes alternately beneath the pistons of the vertical cylinders, raising one whilst the other sinks. The two pipes leading from the ends of the horizontal cylinder to the vertical cylinders are connected by a third pipe; the connection, however, between it and each of the first mentioned pipes being out off by valves, which, however, can rise immediately the pressure of the water rises above that requisite to raise the rods of the man engine. The stroke of the man engine rods can, therefore, be limited by stops, so that the man engine rods can have a pause at the end of each stroke, whilst the piston rod of the horizontal and steam cylinder is completing its stroke.

Another mode of ensuring a pause or very slow movement at the end of the stroke is to give the end of the connecting rod an elliptical instead of a circular motion. This may be done by connecting the end of the connecting rod by two links of equal length with the ends of two cranks of equal length, but whose centres of rotation do not coincide. Or the two links may be of unequal lengths (say 1 to 8), and the cranks also of unequal lengths (in inverse ratio to their connecting links) but having their centres of rotation coincident and rotating in opposite directions, the cranks being at right angles with each other when either of them passes over a dead centre.

The following particulars of the driving arrangements of the new man engine at Przibram will serve as an example, being similar in general design to the man engine at the Maria Shaft, near Clausthal. The levers are arranged as shown in Fig. 1. The rotating crank is 5 ft. 3 in. long; the arm, C B, is 13 ft. long; the arm, C A, is 15 ft. 9 in. long, hence the stroke of the main rods is 14 ft. 6 in. The arms themselves are conical tubes (made of sheet iron 36 in. thick); the outer ends are 2 ft. diameter, the diameter enlarging to 2 ft. 9 in. towards the boss. The boss is cast in two halves, which are bolted together, each half having a cylindrical projection to which the tubular arms are rivetted. The cast iron forks or eye pieces have similar cylindrical projections, to which the outer ends of the tubular arms are rivetted. These connections are still further secured by angle iron hoops inside the arms. The two halves of the boss are still further secured together by two wrought iron hoops shrunk on to cylindrical projecting pieces concentric with the axis. The tie, A B, consists of two rods 9 in. by 1½ in. in section. The connecting rod is 33 ft. long between centres, and is made tubular, 23 in. diameter in the middle, 18 in. diameter at the end next the crank, and 15 in. diameter at the end nearest the levers. In order, however, to reduce the length of the crank pin, the end of the tube nearest the crank is connected to the crank pin by a solid wrought iron rod 6 ft. 6 in. long, and 5 in. thick, which is provided with the usual strap, bushes, &c. The end to which the tube is attached terminates in a circular disc, which is connected to the tube by a stout angle iron hoop specially forged, or of Bessemer steel. The hoop is connected to the tube by three rows of rivets. The connecting rod, B B', consists of two wooden connecting rods rectangular in section with the diagonals placed vertical and horizontal, and the rods are stiffened against side bending by cross bolts and ties connecting them.

The rods connecting the levers with the upper ends of the man engine rods are 15 ft. 9 in. long between the centres, and 4 ft. 2 in. by 3 ft. 7 in. in section. Where these rods are connected to the man engine rods a cross-head is interposed, the cross-head working against four angle irons covering the corners of the vertical wood guides. The guides for the two cross-heads consists of six vertical rods placed in pairs; the one cross-head working between the first and second pair, and the other cross-head between the second and third pair. The man engine main rods consist of four bars 4½ in. x 3 in. in section, and are not attached directly to the cross-head pin, but indirectly by five packing plates or links 10 in. centres. The shaft rods reach to a depth of upwards of 800 yards. The engine is connected with the crank shaft by two motion shafts, the gearing of the first being 3 to 10, and the second 1 to 3, so that for 45 revolutions of the engine-shaft per minute, the man engine rods make 4.5 revolutions per minute. The fly wheel is 16 ft. diameter, and weighs 5½ tons.

MAN ENGINES WITH DIRECT TRANSMISSION.

1.—WAROQUE SYSTEM: In this the upper ends of the man engine rods are attached to the piston rods of two hydraulic cylinders, which form the so-called hydraulic balance. These cylinders which are placed side by side are connected at the bottom by a semi-circular pipe, on which the stuffing boxes of the piston rods are cast. The cylinders are connected at their upper ends by an open box, and are filled with water both above and below the pistons and stand a few inches high in the connecting box at the top; the water above the pistons flows alternately from one cylinder to the other through the connecting box. One of the piston rods is continued upwards, and forms the piston rod for a steam cylinder (double-acting) which drives the man engine. In order to ensure that the piston rods shall keep their relative positions, it is necessary that the amount of water filling the space beneath the pistons be kept constant, and since it is impossible to prevent leakage round the piston, water must be forced in beneath by a pump. It is the difficulty of keeping the exact quantity of water beneath the pistons which is aided as the weak part of the system, though this object ought to be readily attained by an automatic arrangement setting the force pump in action immediately the relative positions of the rods begin to change. The steam cylinder is provided with a catenact governor to ensure a pause at the end of each stroke.

COOMBE'S SYSTEM, which has been tried at Seraing and Przibram, consists in attaching the upper ends of the man engine rods to the piston rods of the two steam cylinders (double-acting). The piston rods are prolonged through the upper cylinder cover, and are attached to the ends of a common chain. The chain passes from the end of one piston rod upwards and over a pulley, then downwards and beneath a second pulley, upwards from this and over the top of a third pulley, and then downwards to the second piston rod. The first and third pulleys are placed at the same height, but not parallel; the reason of this is that the direct line between the two pistons gives too small a diameter for a chain pulley. In practice the arrangement seems to have been liable to constant breakages.

HAYREZ SYSTEM.—In this the rods are actuated directly from the piston rods of two steam cylinders. Between each piston rod and the corresponding man engine rods a long wrought-iron rack is inserted. The teeth of the two racks are placed facing each other, and geared into a common wheel placed between them; the back of each rack is guided by a grooved pulley. The bearings of these guide pulleys are supported on the same cross beams that carry the bearings of the toothed wheel. In practice the use of such gearing has been found to entail serious defects.

The man engine at the Prè Shaft, near Rive de Gier, is actuated by two double acting steam cylinders with catenact governors. Beneath the steam cylinders are placed two water cylinders, the piston rods of which are a continuation of those of the steam cylinders. These water cylinders are connected above and below, and form an hydraulic balance as in the Waroque system. In addition the man engine rods are connected by two chains which pass over two pulleys placed one on each side of the water cylinders. These maintain the man engine rods in their relative positions, but have all the weight to carry immediately there is any leakage of water from beneath the pistons of the water cylinders. By placing a thimble valve in the pipe connecting the bottom of the two water cylinders the speed of the rods can be regulated.

This number brings us to the conclusion of these Notes. The section of mine drainage is omitted since this subject is better treated under the head of engineering. The dressing of ores, too, forms the subject of a special course of lectures which are given also by the able director of the Académie, Berggrath Dr. Von Groddeck, and which cannot be usefully reported in a newspaper.

THE RESOURCES OF VIRGINIA.—THE NORFOLK AND WESTERN RAILROAD.

The improved equipment of this road promises to facilitate the development of Virginia to an extent that British capitalists will not fail to take part in; so that many of the facts given in the letter of Mr. F. Burt to Messrs. Vivian, Gray, and Co., will be of general interest. The expediency of passing the March dividend has of course created much discussion, and has resulted in a depression of the stock. There is no doubt in his mind as to the temporary nature of this depression, nor of the complete vindication of the policy of using the earnings in betterments, the result of which may soon be looked for in the traffic returns. It would possibly have been more advisable not to have commenced paying dividends until the more immediate requirements of the line as to equipment had been supplied. This, however, does not really affect permanent investors, while the present application of the funds is certainly for the best interests of its shareholders.

The mineral wealth of Virginia is really marvellous; the development of iron, coal, manganese and other mines which hitherto have not shipped a single ton of ore is being rapidly pushed forward. To give some idea of the vast undeveloped wealth of the country adjacent to the line, Mr. Burt mentions that when at Pocahontas he visited the Laurel Mine in the Flat Top Mountain Coal District, he traversed some 3500 ft. of a 9-ft. gallery running in a vein of coal from 12 to 13 ft. thick. This vein has been traced to run more than 100 miles, and is of the best quality. Some 80,000 tons of this coal were lying in the open awaiting transportation. This coal traffic is emphatically new business. It is surprising to see what an extent of coal deposit has been opened, this, too, not by shafts and deep workings, but by drifts in the face of the mountain, draining naturally, and all handling and movements done upon down grades. Drifts and galleries have been driven into this for nearly 10,000 ft. Other mines will, doubtless, shortly be opened in this same district.

This is a virgin coal territory altogether, and the opening of a new era for the railway, which should result in an immediate increase in its traffic receipts. It is the nearest coal field to all the South-Eastern States and the South Atlantic seaboard; 750 miles of railroads have to be supplied, as well as all the towns and villages along the line, the many furnaces now in the course of construction, and the shipping demand at the port of Norfolk. If no other method of approach had been provided these facts would alone have warranted the construction of a railway from Norfolk to the coal at Pocahontas. It is fair to estimate the annual added traffic now from coal alone at 350,000 tons, with a constant increase. To handle the coal at Norfolk required the creation of terminal facilities for the transfer from rail to water transportation, and this again demanded immediate expenditure for future results.

ROMAN GRAVELS MINING COMPANY.

The report of the directors presented for presentation at the meeting on Thursday next states that the mine, aided by the improved dressing appliances, continues to yield ore in very satisfactory quantities, the returns being larger than in any previous year of the company's existence, though the depreciated value of lead counterbalances the benefit of the increase. The output of ore in the twelve months was 3182 tons, 3122 of which were lead, and the remainder blende. This quantity it will be seen is 100 tons of lead more than in the previous year, but only realised £31. 17s. 6d. more. The average price obtained for the lead ore, exclusive of potter's ore, was 9s. 10d. a ton, against 9s. 11s., or 5s. 2d. less, and for blende, 2s. 2d. against 3s. 10s.

The actual profit on the 12 months' work, after charging 594s. 5s. 6d. for a pair of air-compressing engines, a boiler, and a rock-drill, to revenue, has been 7181s. 1s. 9d., but owing to the smallness of working capital it has been necessary to charge upon another month's cost, making a year and one month's costs against a year's returns, which reduces the apparent amount by 1455s. 9s. 3d.—that is, to 5725s. 12s. 6d. This net profit with the 2122s. 1s. 3d. brought into the account from the previous year, makes a total of 7847s. 13s. 9d., 60s. 0d. of which has been applied to the payment of the dividends in May and November last, and the balance 1827s. 13s. 9d. is carried to the new account.

The land, farmhouses, and cottages, the purchase of which for 1295s. we reported at our last annual meeting, has been paid for, and a portion of the land, with the farmhouse, &c., sold for 500s. 795s. from the reserve fund has been temporarily invested in the payment of the balance of this 1295s., and as the land retained was necessary to us we submit that its application for the purpose is advantageous.

LONDON AND SOUTH AFRICAN EXPLORATION COMPANY.

The report of the directors presented for presentation at the meeting on Monday next submit balance-sheet and accounts to Dec. 31. It appears that the year's profit was 79,567s. 1s. 4d., to which must be added 17,368s. 5s. 4d. undivided profit brought forward; together 96,935s. 6s. 8d., out of which 49,994s. was paid in dividends, leaving a credit balance of 46,941s. 6s. 8d. The directors announce that further satisfactory progress has been made with the company's business. The past year was a year of unparalleled adversity on the South African diamond fields, yet the company's surface revenue exhibits a very considerable increase, whilst the income derived from mineral rights has been fully maintained. In 1887 the surface income was 40,463s. 17s. 4d., compared with 29,803s. 6s. 2d. in 1886, an increase of 35 per cent. In consequence of the general depression the Bullfinch Homestead Company has not yet been able to discharge its indebtedness, but this company has paid rental and interest, and its claims are hypothecated to this company until the debt is paid.

By order of the Government Inspector, high ground in some of this company's unworked ground, pronounced to be dangerous to neighbouring claims, was taken down, causing an outlay to this company of 26,550s.; steps have been taken to prevent a repetition of this expenditure, but the distribution of the past year was seriously affected by such outlay; 50,000s. were distributed, which might easily have been 75,000s., but for the before-mentioned order. It has now been successfully established that the company cannot legally be compelled to do any such work. The company has also succeeded in an appeal to the Judicial Committee of the Privy Council, affecting the title to the farm Alexander's farm. By a decision of the High Court of Grigoland it was attempted to force upon this company a title containing servitudes and reservations for which there was not the least warranty, and which were prejudicial to the company's interests. By the Privy Council judgment the adverse decision of the High Court of Grigoland has been reversed.

* Being Notes on a Course of Lectures on Mining, delivered by Herr Berggrath Dr. Von Groddeck, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

FOREIGN MINES.

ANTIOQUIL.—April 27: The following is the statement of profit and loss account for the month of February: 60 tons of attle produced 4½ ozs. gold; 72 tons of mineral and attle produced 42½ ozs. gold; total, 47 ozs. of gold. Estimated value of the gold, including exchange, 1611. 11s.; cost at the mine at Medellin and in London, 2851. 9s.; estimated loss 1231. 18s. In addition to the cost of 2851. 9s., the sum of 81. 18s. has been spent on capital account.

BARANCANES COPPER.—Joseph Garland, Alentejo, Portugal, April 17: On my arrival at the mine with the English miners and engineers on March 26, I found a few men employed in keeping the mine clear of water and doing a little surface work, but nothing was being done underground, and the hand-dressing which had been carried on for a short time had for some weeks past been suspended. The water is kept out of the mine by barrels worked by a small vertical engine, the capacity of which is about 75 gals., and the rate of winding necessary to keep the mine in fork at the end of last month was 37½ barrels per hour, equal to 2812 gals. per hour, or, say, 47 gals. per minute. The engine is much out of order and consumes a large quantity of fuel. The shaft, which is divided for the two barrels and runs in a straight line, is 24 fms. deep. There are three levels driven on the lode at depths of 5, 13, and 24 fms. respectively. The lode at the 6th is intersected by a cross-cut driven about 2 fms. south-west from the shaft. North-west a level has been driven on the lode for at least 15 fms., as is evidenced by a rise going up to it from the 11, but neither in this nor in the south-east direction can the lode be examined, as the level is gone together at each end of the shaft. This level may be regarded as of no consequence and need not be cleared. The 11 is extended north-west 25 fms., laying open a lode 2 to 3 ft. wide (as far as the timber will admit of being seen) and containing a little ore in places and a limited quantity of stopeing ground in the back of the level; the bottom of the level is more productive than the back. The back of the level, for several fathoms behind it is valueless, the lode being about 15 in. wide and unproductive. The same level has been driven south-east over 20 fms., but owing to the giving way of the timber, and the choking up of the level for some fathoms we have not yet seen the end; we are clearing and securing the level. As in the north-west direction there is a little stopeing ground in the back with good ore in places along the bottom. The 24 north-west has been extended 30½ fms., and for the greater part of that distance, and with the exception of a few fathoms behind the end and one other short distance contains a fine-looking strong quartz lode, the size of the level, and probably larger in places, with copper ore alternating between a good sprinkling and solid leaders placed in the end. The end of the lode is disordered, and a portion appears to stand further westerly. South-east of shaft the lode which in this level is intersected by a cross-cut, driven north-east 3 fms., has been followed 29 fms., and varies in width from 2 or 3 ft. to 8 or 9 ft. For a distance of 20 fms. the lode though not uniform in size or productiveness yields good stopeing ground, the ore sometimes occurring in leaders 2 or 3 in. wide, sometimes through irregularly scattered conical pieces of rock in nests and pockets yielding large stones of rich yellow and variegated copper ore with a little grey ore. These remarks apply more particularly to a trial stope we have put over the back for 5 fms. in length. The lode contains fine lumps of ore in many places in the bottom of the level, and there are excellent indications of richer deposits lower down. There appears to be a change of ground in the end and a split in the lode, but appearances lead us to expect more settled ground and a continuation of ore ground further south. The general bearing of the lode in the bottom level is about south-east and north-west and the underlie north-east about 74°, or 1 ft. 9 in. in a fathom. I hope soon to be able to submit to you a plan and section showing the proposed site of the new shaft, which will be required and which is of great importance to sink to the present bottom level and for deeper levels as early as possible. Seeing that the lode increases in size and richness from level to level downward and that we have in the 24 a capital lode for the very shallow depth, there is every reason to expect, and I fully anticipate, a valuable property in depth.

Under date of April 14, Capt. Garland forwarded two samples of ore, one of which, he says, represents what we may expect from the yellow ore. This contains, by analysis, 22.39 per cent. of copper and 9 ozs. 2 dwts. of silver per ton of ore. The other sample, (Capt. Garland says) he does not expect, will be of sufficiently high quality to admit of shipment, but he wishes to know the percentage for his guidance. This proved to contain 13.53 per cent. of copper.

CALIFORNIA GOLD.—The usual weekly report has not yet been received, having been delayed in transmission. Mr. Alfred Rickards, the manager, cabled the directors on the 25th inst. as follows:—“Mill run (34th week), 335 tons; yield, \$3,300 (\$607).”

CANADIAN COPPER AND SULPHUR.—Francis Bennetts, April 12: Hartford Mine, No. 5 Shaft. The vein in the 10 ft. is from 3 to 4 ft. wide, composed of ore and slates. The vein in the 23 ft. is about 4 ft. wide, solid ore. The vein in the rise, in the back of the 40 shaft, is about 2 ft. wide of ore. The vein in the rise in the back of the 50 shaft, is 2½ ft. wide ore.—No. 3 Shaft: The vein in the 10 shaft is about 2½ ft. wide ore.—No. 1 Shaft: The vein in the 25 shaft is 3 ft. wide of ore, mixed with a little slate. Other parts of the mine are without alteration. The smelting-works are running well, and turning out fair quantities of regulus.

COLOMBIAN HYDRAULIC.—A. E. Oakes, March 17: Run No. 93: This run from the upper mine from Feb. 15 to March 15 (during which time washing was carried on for 603 hours) has resulted in a return of \$4990 from the upper sluice, \$220 from head of lower sluice, bought gold \$629.37; making a total bar worth \$5819.37. The total cost at the mine for the month being \$1745.90, there remains a clear profit of \$3874.47, equal to about 7754. Considering that February is the shortest month in the year, the above must be looked upon as a very good run, and I fear the coming month will show a falling off, because our bank is now very decidedly lower than it has been lately. All who are acquainted with hydraulic mining know that there must be great fluctuations in the returns; but for the benefit of those of your shareholders who are in the dark I may mention that when we unexpectedly run into enormous boulders, each as big as a house, or when thick seams of hard pipe-clay crop up in the gravel, these obstacles have to be blasted and removed by hand before we can wash the gravel they cover.

Again, some gravel is as hard as concrete, whilst others are soft and far more easily washed. Also when we have very high banks by washing out the toe we can throw many hundreds of tons at one fall, and this crushes itself by its own weight, and is quickly carried off by the water, but when the banks are low we can only throw them little by little. Our pay channel is so narrow that I am at times compelled to wash poorer gravel than I could wish. My endeavour is always to keep the mine going, so that if we cannot get good returns we may get poor ones rather than none at all.

COLOMBIAN UNITED.—Mr. Macrae's report from the mines for the week ending April 7 is as follows: The 13th level, east of the shaft, still shows some good mineral about 3 in. Winze No. 2 from 12th to 13th levels is down about 15 ft., carrying mineral from 2 to 3 in. width. No. 2 stope has varied but little in appearance during the past week; it carries an average streak of 5 in. No. 3 stope has 4 in. of good mineral. In the east end of the stope the concentrating mineral has given place to about 2 in. of cobbling ore. In the West Terrible tunnel the Fenton lode has not yet been struck, although we expect to strike it every day. On the Jas. G. Blaine lode west there is a streak of ore from 1 to 2 ft. of good quality. In the driving east on the same lode, which is in about 30 ft. from the tunnel, the lodes have about 1 in. of quartz with a little mineral. There is still a scarcity of water in the creek, which prevents us putting through more than 10 or 11 tons of dirt a day. We have now on hand about 4½ tons of lead headings and 2½ tons zinc headings. Sent away 152 sacks of second class, weighing 8 tons 439 lbs.; 24 sacks of screenings, weighing 1 tons 400 lbs.; and 43 sacks of zinc headings: total, 219 sacks, weighing 9 tons 839 lbs. We have 73 sacks of first class on hand.

DAVALA-MOYAR GOLD.—Manager, April 2: Not feeling well last week, I came hither (Otocamund) on Thursday. I am getting on well, and intend to return in four or five days. We are pushing on the prospecting shaft as fast as possible, and I expect to strike the lode in about 50 ft. deeper, or 150 ft. from the surface, or 200 ft. in depth from the crown of the hill. I have good faith that when this shaft gets below the old workings we shall get a good reef and good gold. Yesterday I met Mr. —, who has just returned from Mysore, where he paid a visit to the Balaghat Mine, where they have sunk below the old workings some 30 ft., and have a reef 3 ft. wide, which Mr. — affirms will go from 4 to 10 ozs. per ton. He showed me some splendid stones which he broke out himself. This news I consider encouraging to all Indian mines, and to the Davala-Moyar very much so, as there are many reefs on the estate with the surface worked out, which, in my opinion, if sunk on below the native workings good reefs will be found.

DENVER GOLD.—Frank S. Craven, April 9: 900 west drift is in 610 ft. from shaft. The crevice is 20 in. wide, and more heavily mineralised than it was; a mill run just completed on 9 tons ore yielded 2½ ozs. gold over ¼ oz. per ton. The 1050 west drift is in 170 ft. from shaft. The crevice is now 2 ft. wide, softer, and apparently better. No mill run to report at this writing. No smelting ore. The 1150 west drift is in 446 ft. from shaft, drift follows footwall. Crevice 8 ft. wide, and practically bare in the west wall; the 1200 west drift is in 563 ft. from shaft. It carries 15 in. of a crevice of low grade ore. The 1275 west drift is in 356 ft. from shaft. It continues to open a good crevice, which is now 20 in. wide. A mill run on 13 tons of ore from it has just been made giving a yield of 5 ozs. gold, or at the rate of over ½ oz. per ton. Carries considerable smelting ore. The 1350 west drift is in 106 ft. from shaft, it is quite barren of pay, but softer to drive than it has been. The 1350 east drift has just been started from bottom of shaft, and is now in 6 ft. It carries 6 in. of what appears to be fair ore. The 1350 winze is in 21 ft.

EEERHARDT.—Frank Drake, March 31: Work for the week has progressed favourably as usual. The seam of ore in the winze mentioned last week, as yet shows no material change, but may at any time come in larger. I shall cut along the seam in the bottom of main drift towards the face (from the winze) to ascertain whether or not there may be some more favourable point for continuing our sinking on the seam, and follow downwards wherever the ore looks the best. A says of some of the winzes ore this week have shown about \$90 per ton. A quantity of this ore is what we are trying to find. The work in No. 3 rise is being pushed ahead with considerable material, with but one change, looking favourable for an improvement. I am not running to take out all the ore we have in sight, but to ascertain, if possible, whether it enlarges at any point near or in main shaft.

ENGLISH-AUSTRALIAN.—Mark Pollard, Fryerstown, March 12: 320 ft. level: We have crushed 150 tons of stone from the stope this month for 10 ozs. 2 dwts. retorted gold, which is very poor; we intend to have another crushing from the stope. Also put up the rise 100 ft. further, to prove the ground, as I think we shall discover some quartz in the western wall; that is the only chance we have, as the stone on the lode is very poor, and cutting out as it goes north. We have also crushed 46 tons from the 140 ft. level from the stope north of cross-cut, result 10 ozs. 10 dwts. retorted gold; this stone is also very poor, and the stone cut off in the face. We have commenced to rise at this point, and I think there is stone over the back as the ground is broken up, and a leader making in the rise about 6 in. thick. We crushed 56 tons from the tributary at the 260 ft. level for the small yield of 3 ozs. 11 dwts. retorted gold. This party has been paid for the work done, and the balance is payable. We have crushed and cleaned up from the party working on the north boundary from 43 tons for 1 oz. 4 dwts. retorted gold. This party has also knocked and left the mine; they were four weeks breaking this crushing. We also crushed another small lot of 15 tons from a party working a surface leader east of the engine-shaft for the small yield of 8 dwts. retorted gold. We have crushed during the month 345 tons for 26 ozs. 11 dwts. retorted gold, which is very poor all through. We have also cleaned copper plates for 32 ozs. 8 dwts. gold; retorted quicksilver for 1 oz. 14 dwts. of gold. We have been overhauling the boiler,

machinery, engine, and batteries, and so have knocked off the underground men for one week. In meantime we will consider what would be the best to do with the working of the mine, and I shall be able to give you some information by the next mail of what I intend to do. I have just completed the contract for driving south and east from the new shaft without meeting with any stone worth notice. Just at the end of the 50 ft. they passed through a black bar of slate, and on the eastern side of this slate there is broken-up sandstone, with small leaders of quartz running through the sandstone, so I think it will make stone as it goes east. The receipts for the month ending March 12 were:—Gold from stamps, 1071. 3s. 8d.; gold from plates, &c., 1307. 9s.; on account of 25 tons pyrites, 804. 1s. total, 3177. 12s. 8d. The expenditure for the same period was 3362. 15s. 8d. against a debit of 191. 2s. 7d., against which there was an estimated further amount of 321. 10s. to be received for pyrites. The colonial balance was 4291. 4s., and there were no liabilities.

FRONTINO AND BOLIVIA.—April 27: The following is the statement of the profit and loss account for the month of February:—3508 tons (of 20 cwt.) from General Mines produced 2519 ozs. (average 0.683 ozs. per ton); gold bought, 160 ozs.; total, 2679 ozs. Estimated value of the gold, including exchange, 71181. 1s.; cost at the mines at Medellin and in London, 55271. 5s.; monthly allowance for freight, commission on gold sales, and sundry other fluctuating outlay not immediately ascertainable (estimated at) 3004. 1s.; paid for gold bought of tributaries, 2847. 15s.;—26122. 1s.; estimated profit, 10034. 19s. In addition to the cost of 55271. 5s. the sum of 1791. 9s. has been spent on capital account.

HOOVER HILL.—April 9: I have to-day shipped through Messrs. Brown, Bros. and Co., of New York, one box containing one bar of gold, weight 136½ ozs. The mill boiler is doing all right now, and everything is running smoothly.

ISABELLE GOLD AND SILVER.—Manager, March 31: I now send you mine foreman's report (Morcer is an old Cornish miner) corroborating what I wrote you on the 28th. At the same time I am still of opinion that no time should be lost in sinking, so as to extract cheaply the rich ore under the 220 ft. level. The storm still continues to stop hauling ore, so that the mill is idle. I am in hopes, however, that in a week or so the roads will be so that we can recommence hauling and running the mill. The mill is now in first-class working order. We have two pumps to handle the solution, so that we shall have no delay from this cause. We have made further additions to our precipitating tanks, to enable us to handle more copper. I think we ought to manage two carboys of copper per month, which should set us over \$4000 from that source alone.

Foreman's Report: On the ore body struck in running the north drift at the 220 ft. level I have started a drift, and it is in 5 ft., all in very fine black ore, and looks very favourable for a fine body next to the hanging-wall of the vein. From the south-west drift on the 220 ft. level I have started an upraise on the vein, which is opening out very nicely, carrying some very rich ore. The upper stopes from the same level are looking much better. Everything in and about the mine is working well.

ROBINSON AND DONALDSON.—Mr. Alfred Rickard, in his report for the week ending March 31, says respecting the Donaldson Mine: The lode in the No. 2 stope is holding its own fairly, and putting out good ore. In the intermediate level, north of No. 2 winze, the ore vein is of good quality, and the ground generally is favourable to its improvement. The No. 3 level is in 255½ ft., and yields 2½ tons of smelting and 1 ton of milling ore per fathom; the lode averages 1 ft. in width, most of which is first-class smelting ore, and to all appearances the drift has before it a fine course of ore. The lode is bunched in the No. 3 stope. In places it consists of a vein of smelting ore 4 in. wide, and in places it will yield milling ore for a width of 2½ ft. The No. 4 cross-cut has in places some fine mineral, which is probably the upper part of the lode. The No. 4 stope will yield pay of an average value in the top parts. In the Champion everything has been fixed, and work will be resumed underground this coming week, when we shall begin raising ore. Further advice just received from the mine state that the large building for some time past in process of erection for the accommodation of the extensive new plant for operating the Champion Mine has been completed. The double skip-shaft has also been finished from the State to the lowest level in the mine, and is pronounced one of the finest in the State by all who have seen it. The lode in the lower level of the Champion is from 10 to 14 ft. in width. At the Donaldson the Hallidie tram has been working regularly.

LAKE SUPERIOR NATIVE COPPER.—Captain Williams, March 31: No. 1 shaft on the course of the lode is sunk 8 ft. 6 in. At this point the lode has improved, and as I anticipated is now producing some very good native copper; the lode is 8 ft. wide. No. 2 level north on the course of the lode advanced 5 ft.; the lode here is very productive of native copper, is strong and well defined, and carrying good and regular walls. No. 2 level south advanced 13 ft. 4 in., the lode is 6 ft. wide, and is producing some very good native copper. I have suspended the driving of this end for the present to cut through the part of lode in the hanging-wall. No. 1 level south advanced 12 ft. 7 in.; lode 6 ft. wide, producing good mill work for native copper. No. 1 winze sunk 3 ft. 6 in.; lode 6 ft. wide, producing a little copper. Cross-cut through lode at No. 3 shaft advanced 6 ft. 4 in.; the lode here is 10 ft. 6 in. wide. Having got through to the footwall we have commenced driving towards the No. 1 level south from No. 1 shaft, and hope to communicate in about three weeks from this. The lode at this point produces good mill work, and looks well for future improvement. In addition to the native copper, good quantities of native silver are being opened up well, especially towards the south, which is a great feature as regards the future of the mine. I am glad to say as we get deeper in No. 1 shaft the water gives us no trouble whatever, the small Northey force pump doing the work very satisfactorily. We continue to make good progress at surface. All our machinery is doing good duty.

NEW EMMA.—George Cullins, April 2: Shaft is now sunk a sufficient depth to admit of placing the large pump station, and am now placing pump, and also running cross-cut, as mentioned in my letter of March 12. Sinking will again be resumed as soon as large pump is in place. Work in cross-cut is being pushed during this time, and will be continued. Everything is working in good order.

NEW QUEBRADA.—Report for Feb.: Dispatched to the coast for shipment: Regulus from smelting-works, 387 tons, 24.98 per cent. dry; ore from the mines, 2042 tons, 9.84 per cent. dry; total, 2429 tons. Forwarded from mines to smelting-works, 17 tons, 5.81 per cent. dry; Home arrivals, 321 tons; sales of ore, 373 tons, average price per unit, 11s. 8½ pence; quantity of native silver, 28,469 tons; stock at the mines on Feb. 28, 3068 tons; stock of ore and regulus on wharf at Tucuman on Feb. 28, 5323 tons.

PIERREFITTE.—Manager, April 23: Enclosed you will find the ore return for the past week, which shows a very good result. I am very glad to be able to inform you that the lode has again improved in value in the stopes in the north-west level, and are worth from 1 to 4 tons of lead and some blende per fathom, the furthest stope in being the richest. In driving the end we followed one branch of the lode, and being, however, another branch under it. We found in stopeing that this lower branch much richer than the upper one, as I have stopped driving the level and put the mine to stope until they have taken away enough of the lode to allow them to drive on the best branch; 30 miners are at work in this part of the mine. I think we shall have a magnificent course of ore going north-west. We have also 12 men stopeing in the rise. Here the lode is very large, but is not rich for lead, being worth from 15 to 20 tons per fathom. On the south-east side of the slide we have 10 men at work. Here the lode is looking much better than it was, but the level is still still poor, there not being enough lead to sale. The new adit level is now in 50 fms., and if the lode has the same inclination downwards as above we are now close upon the lode, and every day I expect to hear it is out. In two or three days I shall have everything ready to bring down ore. The brake, incline railway, and little wire ropeway are completed. The carpenters are now putting a roof over the brake gear. The machinery is working well, and we have plenty of water for all purposes.

REANCO.—J. S. Treloar, March 17: The produce obtained for February from the treatment of the large quantity of ore raised during the month (including eight boxes of vein stuff) amounted 503 ozs. of gold (8.85 ozs. per ton) at 8s. 6d. per ounce, 2131. 15s. 6d. The estimated cost, at exchange 215d., amounted to 1681. 17s. 9d.; leaving an estimated profit for the month of 441. 17s. 9d. The produce was obtained from two points—Holland's shaft and No. 6 Vein, but mainly the former. For the present month the produce, which is being derived from the same source, will again enable us to show a balance on the right side. I have much pleasure in announcing the discovery of a new vein in Holland's shaft. It was first touched some time since, when a pit was being dug in the footwall for the reception of timber, but owing to the presence of water we could not then say whether it was a ramification of the Francisco Antonio vein, or a new one. Towards the end of last month, the ground having drained, the pit was further examined, and what proves to be a new vein was met with 7 fms. below the 15. Its position is 4 ft. south of, and about 7 ft. under the Francisco Antonio, and it is in all respects the strongest vein we have yet seen in the jacinto. In descending nothing more can be done on it, in consequence of the vein being so close to the surface, but from what can be seen at present it is running up under the timber, and we may have back on it to 25 ft. possibly to surface, but I hesitate to hazard an opinion upon this until more has been seen.

RHODES REEF GOLD.—Manager, April 2: Feeling slightly out of sorts last week I thought the best thing I could do for all parties was to take a week's change in Otocamund. I am happy to inform you I am getting on all right, and propose returning to work in four or five days. On account of my absence I cannot give you a detailed account of the week's work; but the mill has been running night and day, and the plant shows a considerable amount of free gold. I am sorry to have to inform you that I have not been able to start the reverberatory furnace on account of the illness of those instructed in this very special work. This has been an exceptionally bad season, I think, on account of the heavy monsoon, but I trust everything will be in good working order in the course of a fortnight.

RICHMOND CONSOLIDATED.—Telegram, April 24: Week's run (one furnace), \$14,000, from 293 tons of ore; refinery, \$15,000. Longley, April 2: The 300 south drift from station has been run 13 ft. Total 275 ft. Running through old ore chamber. The 300 south-west drift from station has been run 15 ft. Total 4.8 ft. In limestone. The 300 south-west drift from south-east has been run 20 ft. Total 93 ft. In limestone. The 1050 north-west drift from station has been extended 23 ft. Total 566 ft. In quartzite. The 1050 north-east drift from north-west drift has been extended 19 ft. Total 248 ft. In crushed limestone.

RUBY AND DUNDERBERG CONSOLIDATED.—April 2: Dunderberg: The upraise from the 300 ft. west cross-cut has been advanced 10 ft. during the week; total, 450 ft. above the 300. There is not any change to report in any of the stope now being worked on tribute. Have shipped 7 tons tribute ore this week, and have two men, four contractors, and 15 tributaries at work.—Home Ticket: The orebody at the end of the drift from the perpendicular shaft is improving slightly in quality; the size of the orebody is also increasing slightly. Have shipped 70 tons of ore this week, and have between 70 and 80 tons at the mine ready for shipment, and have 15 men at work. Telegram, April 21: 33 tons of ore shipped during the week, beside 20 tons tribute ore; 40 tons ore smelted resulting in \$550; 38 tons tribute ore smelted resulting to company \$143. Heavy snow again delayed shipments.

SANTA BARBARA.—J. S. Treloar, March 17: The mineral treated at the spalling-floors during February amounted to 1240 tons, of which 631 tons were rejected, 610 tons being stamped; 426 tons of which came from the refuse heap, the remaining 174 tons being raised in the month from the mine; 80 tons of amalgamation tailings sand were also retreated at the No. 4 stamping mill. The total produce obtained was 537 ozs. of gold (\$380 ozs. per ton), worth at 8s. 6d. per oz., 2231. 4s. 6d., and the estimated working cost for the month at

exchange 215d. being 7991. 5s. 8d., leaves an estimated excess of expenditure of \$311. 1s. 2d. on the mine working account during February in addition to which \$751. 11s. 4d. was estimated as having been expended on capital account during January, in respect of the construction of the new water-course and hauling machinery. The figures for February show an improvement upon those preceding since August last, and I trust the general result will be still more favourable for the current month.

UNITED MEXICAN.—Mr. Hay, Guanajuato, March 24: Mine of San Cayetano de la Ovejera: In the frente of San Juan the width of the lode has decreased to 2-23 metres. The strip of fair ore has disappeared, and we have only "pintas" (appearances) of ore here and there. We hold the rights to the lode, but found only barren mountain on the other side. In the contratiello of San Juan the ore has given out entirely, the lode measuring 1-20 metre in breadth. In the frente No. 2 of Santa Rosa west we continue to find pretty "pintas" (appearances), so that we expect to find ore in our advance. In the contratiello of San Vicente and frente of the same name to the west the ore is of a fair ley, but only 5½ cargas have been sent to Duran. In the frente a strip of good ore has appeared to the bajo, but it only measures 5 centimetres. In the frente of San Andres east the two strips of ore have again separated; the upper one measures 15 centimetres, and the lower one 10 centimetres, both in good ore. The extraction from this end was 3½ cargas. The pozos No. 1 of San Andres continues in the same state; the lode measures 38 centimetres in ore of a fair class. We have sent to Duran this week 14½ cargas. In the pozos No. 2 of San Andres the width of the lode is 1-10 metres, but the ore is ramified, and does not seem to be as good as that of the week before. It may be that the decrease of value of the lode corresponds to the barren part we traversed in the last winze a fortnight ago, in which case we may expect to find some improvement lower down. From this working 23½ cargas were sent to Duran this week. From all the workings we have remitted this week 124½ of ordinary ore. Returns from the Mine of San Cayetano de la Ovejera one week to March 24, \$354.94; outlay, \$847.34; excess of returns, \$2007.60. As the contract workmen would not receive their wages until last Wednesday those expenses are not charged in the above account.—Finance: Cash balance, \$2-114; estimated value of tortas and ore on hand and under reduction, \$34-500.

TOLIMA MINING COMPANY.—Advices received by the mail of April 26, of which the following is an abstract:—

Friars February returns	\$49,042.7
Cost	\$27,537.04
Subsidia cost	1,031.43
Alto cost	28,568.47
Profit	\$20,474.23
Equal in sterling to 23731. 7s. 3d.	

The underground agent reports: 37 2 4 of ground expended, of which 27 1 3 were productive, leaving 10 1 1 of unproductive ground.

The superintendent states that, owing to the dryness of the season, and the consequent deficiency of water-power, the extraction of the mineral has been necessarily restricted, it being impossible to haul to the surface more than a relatively limited quantity of mineral. At the same time, he says, that the 11 fathom level, as it approaches the region of the rich deposit in the 60 fm. level east, is gradually assuming strength and character, and thus justifies his expectation of meeting with a strong course of mineral in the 70 fm. level east fully realised. He adds, "I am glad to report a decided improvement in the quality and yield of the vein being driven on the 20 fathom south-west level as well as in the 30 fathom east level, on the south lode."

ENGINE SHAFT.—Sunk during the month 6½ ft.; present depth below 70 fm. brace, 43 ft.; relet to eight men, at \$240 per fm. Little alteration has occurred in the character or value of the vein since last advices. The ground is somewhat easier for sinking, enabling fair progress to be made, notwithstanding the frequent stoppages consequent on the limited supply of water at present coming to the pumping-wheel. Pitwork and pump gear in good working condition.

70 FM. LEVEL, East End.—Extended 11 fms. 8 ft.; relet to four men, at \$75 per fathom. The vein is from 5 to 6 ft. wide; of a very powerful character, closely resembling that of the north branch, at the level above at the western margin of the great shoot of mineral, the continuation of the richer portions of which we are hopeful of falling in with at an early date. Present yield about 25 cwt. per fathom.

EAST STOPE.—The vein holds up without change, the principal leader (on the footwall) carrying mineral of a high grade. Value about 2 tons per fathom. **CROSS-CUT, North of 70 East.**—But little was done in this during the month, in consequence of the accumulation of stuff in the 70 workings, from scarcity of water for drawing. Ground stiff and spare for driving.

CROSS-CUT SOUTH, 70 WEST.—Two men at \$125 per fathom; extended 3½ ft. No change has occurred in the end hitherto, but from the appearance of the cross-branch and the large stream of water which still issues from it there is reason to believe that it connects with a vein or branch further south. The ground is extremely hard and slow for driving.

70 FM. EAST WINZE.—This with the 70 west, 60 east, and 60 west ends, being full of stuff, are still in advance pending and are a good supply of water for drawing. **EAST WINZE.**—Present depth below 60 brace 50½ ft. This is not quite so productive as at date of last report, but is in a fine course of mineral worth 4 tons per fathom.

No. 2 RISE, back of 60 east.—The rise is being carried up on south lode, having passed beyond the point up to which the north (or main) and south lodes continue in contact from the 60 fm. level. The lodes now diverge to the extent that it is found advisable to leave the intervening ground stand, and work the veins separately. The lode in the rise is worth 25 cwt. per fathom. Flank portion of the main lode opposite to the rise forms part of No. 3 and 4 stopes (now worked as one), which extend from the eastern end of the rise to the western limit of the cross-course, a length of 35 ft., average value 40 cwt. per fathom of mineral, producing 350 to 400 cwt. silver per ton. Ground stope during the month 31-9 ft.; four men.

No. 2 STOPE, by two men, is almost exhausted of mineral in the back, the ore ground being but 4 to 5 ft. in length, and confined to the western end of the stope. Wrought during the month, 14-4 ft.

No. 1 STOPE, by four men, has likewise fallen off in value; present yield about 25 cwt. per fathom.

No. 5 STOPE (in sole of Velencia's drift) is about 42 ft. long; worth an average of 65 cwt. mineral per fathom; producing 350 cwt. silver per ton. Stope last month 15 ft.. Work was delayed in this during the greater part of the month, the ground above having become weak and commenced to give way; this has now been timbered and secured.

50 FM. LEVEL, cross-cut south, advanced 5 ft. 2 in.; traverses ground thickly interspersed with quartz veins, but as yet nothing of value has been met with. The ground is hard and spare for driving, but not of an uncongenial description for the production of mineral.

STOPE in sole of drift, west of Modesto's winze, has considerably improved during the past fortnight. The extent of ground remaining available for stopeing is, however, very limited, as we are now approaching the point of the horse in the back of the 50, to support which it will be necessary to leave an arch in the workings.

50 FM. WEST WINZE.—The vein is 5 ft. wide, chiefly composed of light blue kilaas, quartz, and looking a small string of mixed mineral on the north wall, but not of marketable value.

40 FM. LEVEL, WEST END.—It has been decided to resume the driving of this end, inasmuch as should discoveries be made at the 20 and 60 fm. levels west its position in relation to these levels—being intermediate, and not more than 20 fms. distant from each—will enable the intervening sections being effectively developed, although the driving of the intermediate ends, the 30 and 50, may not meanwhile have proceeded with.

40 FM. WEST RISE by two men, at \$55 per fathom; this is being put up at a point about 10 fms. west of the engine shaft, on the main lode, with the view of testing this section of ground to the 30, and of improving the ventilation of the mine. The lode in the back is 4 ft. wide, carrying much gossan and quartz, charged with quantities of iron pyrites; rise 7-5 ft.

40 FM. STOPE, on south lode, by two men, at \$40 per fathom; the vein continues without alteration in character or value, worth 10 to 12 cwt. per fm., of mineral, producing from 150 to 200 cwt. of silver per ton.

30 FM. LEVEL EAST END, on SOUTH LODE. The end presents a decidedly improved appearance, and looking good stones of mineral, studied with the elements of native silver. The present bearings of the branches—the lode having divided some distance west of the cross-cut from which the present drive is advanced—indicate convergence, and we have reason to hope for a junction in the course of a few fathoms further driving, in which case good results will, probably, ensue.

20 FM. LEVEL SOUTH-WEST END is advanced 10 ft. The vein continues to improve, the mineral which first appeared in the sole has now extended to the roof of the footwall, yielding saving work. The end presents altogether a very promising appearance.

SANABAJA MINE.—The shaft was deepened last month 4½ ft.; present depth below adit 75 ft. The lode shows little alteration in value since last report, but becomes wider and stronger as depth is gained. The leading vein is mainly composed of quartz, in rimixed with patches of high grade mineral. The new adit being completed and the water coming home we are preparing the shaft to receive the skip-road. Clearing and securing the adit has also been proceeded with. Some good specimens of ore are occasionally found in the debris.

ANGLO-ARGENTINE MINING ENTERPRISE.—The Cordilleras of the Argentine interior have long been known to contain inexhaustible mineral riches, but hitherto they have been practically inaccessible, owing to the prohibitive transit cost of conveying the produce of even the most valuable mines with commercial benefit to the sea-coast. We are, however, pleased to observe that one of the effects of the construction of railways to San Luis and other Andine Provinces of the Republic has been to direct the serious attention of capitalists to those still unutilised stores of fabulous wealth, and we understand that steps are now being taken to develop a number of mineral properties, including gold, silver, and copper mines, some of which have been locally proved to be of a very desirable character. We trust later on to be in a position to give further particulars with respect to this important project; which, we have no doubt, will afford another opportunity for the profitable investment of European capital in Argentine undertakings.—*South American Journal, April 26.*

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Mining Correspondence.

BRITISH MINES.

BEDFORD UNITED.—H. Trezise, April 24: In the 115 end, east on north lode, there is no change to report. The 103 west is without alteration; lode worth 101. per fathom. In the 101 west end the lode is worth 81. per fathom; stopping at 41. The 101 west end of the lode is without change. —**McCallan's Shaft, Bridge Lode:** The shaftmen are busily engaged driving east and west at the 82; there is no change in the lode east or west to notice. The lode in the 42 east is not quite so good for ore, it is worth about 121. per fm. for ore and muddle, and will produce 3 tons of ore and 4 tons of muddle per fm. In the 30 east there is no change to notice; we hope to take down the lode in this end by the end of the present week. The several stopes in the back and bottom of this level are not changed since last report. The lode in the 20 east is without alteration. We have commenced to sink trial pits west of McCallan's about 200 fathoms. The work of the mine progresses satisfactorily.

BLUE HILLS.—S. Bennetts, R. Harris, April 25: On the Pink lode the 80 east end is poor. The 68 east end is worth 81. per fathom. The Baldu lode in the 54 west end is worth 51. per fathom. The 42 east end is worth 61. per fathom. The 30 east end is unproductive, and the Gumpas adit west end is worth 61. per fathom.

BRADA.—R. Rowe, April 25: In the 40 end, driving north, we have still a wide ore lode, more than the width of the level, and the part carried is worth 2 tons to the fathom; the level is therefore leaving good stopping ground. In Prior's end the lode has further improved since last week's report, there being richer ore in the end this week than we have seen before. The present stopes are turning out good ore stuff for the floors. We shall add largely to these stopes and greatly increase the raisings of ore the moment we have our complete dressing machinery ready, and about which we are working night and day.

CARN CAMBORNE.—W. C. Vivian, April 26: In the 105 cross-cut, south from the engine-shaft, the granite continues very hard and compact, and our progress is consequently not so rapid as we could wish. In the 95, west of sump, on the south lode, we have in rising a lode from 4 to 5 ft. wide, in which there are large vugs, or cavities, and which is otherwise made up of flint spar and rich copper ore. As far as we have got up above the level in this rise the lode is nearly vertical. In the 70 south, on the central cross-course, no lode has yet been discovered. In the 40, west of engine-shaft cross-cut, the north lode is 5 ft. wide, composed of blende and copper ore, associated with quartz and chlorite, the whole presenting an appearance highly encouraging, and indicating the presence of an important lode of copper ore within a comparatively short distance of the present end.

CARNARVONSHIRE GREAT CONSOLS.—W. H. Boriase, April 26: We have fixed balance-box to Endeavour's shaft, and connected a 9 ft. length of main-rope, and a fixed main-rope in New shaft from the 14 to the 24. We are now putting in flat-rods in the 14 cross-cut, and also the beam in the pit; a few days more and we shall be ready for the lift, which I am expecting at the station every day. Altogether the work is in an advanced state, and I hope will be ready by the time estimated.

CARNARVON COPPER.—J. Roberts, W. Darby, April 24: In the cross-cut at the 36 (Cae-y-groes) we continue to drive east on the lode, and this week a small slide has come in on the hanging-side, and which is faced over with copper of a promising appearance, and may lead to something good. In the little sump below the 26 (Cae-y-groes) there has improved since last week's report, there being now worth 1½ ton per fathom, and very rich. At the 20 (Garon's) the lode this week is again looking better, and the ore seems to be lengthening. In the stope between the 70 and 80 fm. levels there is no change to notice since reported last week.

CATHEDRAL CONSOLS.—Stephen Davey, Stephen Davey, jun., April 26: Good progress is being made with the driving of the 62 east through the cross-course; the tinstuff coming therefrom will produce from 28 lbs. to 34 lbs. to the ton of stuff. There is no change to remark in any other part of the mine. We have commenced sampling with four heads of stamps, and find the tin coming out quite equal to the assay.

CWM DWYFOR AND BRYNARIAN (Brynarian Mine).—J. Davies, April 25: Joseph's Level: The lode is not quite so perpendicular; it is still narrow and the ground is tough, with hard beds crossing the end, which are difficult to cut through. —**Pennarn:** The lode continues wide, with wall on both sides, and spots of lead throughout the lode. The ground is getting hard and tough, but is of excellent appearance and favourable for improvement.

D'ERESBY MOUNTAIN.—W. Sandoe, April 25: Monthly Report: The stope in the bottom of No. 3 prospect, which from the commencement has been in the poor piece of the lode, has improved during the past week or two, and is now worth about 1 ton of lead ore to the fathom, and from what we can see of the lode directly below us we are well assured that it will further improve in a few days at most, and with our present favourable advantages for breaking the ground here good results I hope will soon appear. The stope in bottom of No. 5 (intermediate level) continues to yield large quantities of good leadstuff, worth on an average 1½ ton of lead ore per fathom. There is no new feature in the mine to notice at present. We may report that there is in the bottom of the No. 6 a good ore lode 30 yards in length all along the bottom of that level, a reserve which we can fall upon at any time when the stopes above may fail. We are breaking and sending to surface large quantities of leadstuff, and are pushing on the dressing as fast as we can. The stuff from the top stope has not been rich for the past month. This with the breaking of the main shaft of the engine has been the cause of our not sampling at the usual time. But we shall send out samples for 20 tons on Saturday next, and hope by extra pushing to make up this.

DEVON FRIENDSHIP.—F. R. Daw Wm. Gill, April 26: The 42 end, east and west of Bennett's shaft, are looking well, and worth 151. and 201. per fathom respectively. A full report shall be sent you next week. The dressing machinery is nearly finished, and we hope to commence working it very shortly.

DEVON GREAT CONSOLS.—Isaac Richards, April 26: Wheel Emma, Inclined Shaft: In the 137 fm. level east the lode is 3 ft. wide, yielding small quantities of copper and muddle ore. —**New Shaft, New South Lode:** In the 115 fm. level east the lode is 3 ft. wide of a promising character, and worth 1 ton of copper ore and 3 tons of muddle per fathom. —**Railway Shaft:** At the 205 fm. level west the lode has been cut into 3 ft., and for this distance it presents a very promising appearance, being composed of strong capel, quartz, peach, and some good quality copper and muddle ore. In the 190 fm. level west the lode is 3 ft. wide, yielding small quantities of copper and muddle ore. In the 160 fm. level west the lode is 4 ft. wide, of a very promising character, worth 1 ton of copper ore and 3 tons of muddle per fathom. —**Watson's:** In the engine-shaft sinking below the 100 level the ground is at present rather troublesome for exploration, and progress is consequently rather slow. In the 100 fm. level, west of the engine-shaft, the lode is 4 ft. wide, and yields good stones of copper and muddle ore. The cutting of pit at the 32 fm. level at the western shaft is in a promising way. In the 20 fm. level east the lode is 3 ft. wide, yielding some saving work of copper and muddle ore.

DEVON GREAT UNITED.—Isaac Richards, April 26: In the 120, east of Willeford's shaft, the lode is 2 ft. wide, composed of capel and quartz, with peach, muddle, and a little copper ore. In the 120, west of Willeford's shaft, the lode is 3½ ft. wide, of a very promising character, and yielding some good saving work of copper and muddle ore. An increased quantity of water flows from the lode, which may be considered a favourable indication, and we have strong hopes of a further improvement in the working good work for tin. In the 100 fm. level, east of the engine-shaft, the lode is 3 ft. wide, yielding some saving work of copper and muddle ore. In the 100 fm. level, west of the engine-shaft, the lode is 3 ft. wide, yielding some saving work of copper and muddle ore. In the 100 fm. level, west of the engine-shaft, the lode is 3 ft. wide, yielding some saving work of copper and muddle ore.

DRAKEWALLS.—Moses Bawden, April 26: We found it necessary to stop the pumping-engine for a few days, as some of the water was again finding its way down into the mine through the crushed ground in part of the deep adit between the engine-shaft and Mathew's shaft, and we have been compelled to make and put in 50 fms. more of large wood launders between these two points. We re-started the engine yesterday afternoon, and trust we may not have to put in any more launders for the remaining distance of said deep adit alongside the great gunnies. We expect now to make good speed in draining the mine below the deep adit. The dressing operations are proceeding in a very satisfactory manner, the stopes and pitches are yielding their usual quantity and quality tinstuff. A full report of our setting on Saturday will be sent you next week, with a detailed account of the work going on both underground and at surface.

EAST BLUE HILLS.—S. Bennetts, W. K. Mitchell, April 25: The adit east end has somewhat improved during the past week; the lode is at present 2 ft. wide, and worth 41. to 51. per fathom. The ground is not so easy for driving, and therefore the more likely to be more productive in tin again shortly. The stopes are without much change. The 40 east end, on the south part of the lode, is at present unproductive. In the 30 east end the lode is about 1 ft. wide, of low quality tinstuff.

EAST BOTALLAOK.—George H. Eustice, Thomas Trehear, April 25: New Ballewidden Lode: The lode in the adit level driving west continues about the same size and quality as for several fathoms past, producing good work for tin. In driving the end east shaft we have again come into old men's workings which we are now engaged clearing. In clearing up the bottom of the level we found immediately under the shaft nothing had been sunk by the former workers, while to the east the bottom of the level has been stoped as far as they could go for the water. We have now sunk the shaft 6 ft. below the level, the lode in the bottom of the shaft being about the size and character as in the level above. The masons are engaged building balance-box loading, and the carpenter preparing stands, &c., for flat-roads, which we are anxious to get to work as quickly as possible as we shall not be able to sink far without a lift being attached to the engine.

EAST CARADON.—W. George, April 26: We continue to make very satisfactory progress with the boring machine in driving the 150 east, on the caunter, where the lode is 2 ft. wide, and looking very promising. The underlie is not so flat, and it contains good spots of copper with more water issuing from the end. The winze below the 130 continues to yield 1 ton of ore per fathom, and the winze below the 90, on Child's lode, will yield 1 ton per fathom. No change in either of the other bargains.

EAST CHIVERTON.—R. Southey, April 26: The only alteration in the mine since my report presented at the general meeting, held on the 11th inst., when it was decided that a winze should be sunk in the bottom of the 90, west of the north and south lode, is that the winze is being sunk in a lode worth 2 tons of rich silver-lead ore per fathom. This 90 has not been worked during the past 12 months, in consequence of the miners refusing to extend it further until the 100 fm. level had been driven up, and a winze sunk to communicate. We have a long run of good ore ground from the winze now sinking to end of the level, which will be available to stopes as soon as the winze is through to the 100. No change to notice in the 100 fm. level. At surface everything is progressing satisfactorily.

GAWTON.—George Rowe, George Rowe, jun., April 20: The lode in the 117 east is carried 6 ft. wide, yielding 18 tons of muddle and copper ore per fathom—a splendid-looking lode. The lode in No. 1 stope, in the back of this level, is worth 8 tons of muddle and copper ore per fathom. No. 2 stope is worth 10 tons, No. 3 is worth 13 tons, and Nos. 4 and 5 are worth 14 tons per fathom. The lode in the winze sinking below the 105 is worth 8 tons of muddle per fathom. The lode in the stope in the back of the 95 is producing 4 tons of muddle per fathom. The lode in the rise in the back of the 70 is yielding 10 tons of muddle per fm. The lode in No. 1 stope, in the back of the same level, is yielding 10 tons; and No. 2 stope is yielding 7 tons of muddle stuff per fathom. All other points are without change.

GLASGOW CARADON CONSOLS.—Wm. Taylor, Wm. J. Taylor, April 23: South Lode: We have not much change to report in the 114 east, it is producing stones of ore; ground more favourable, and lode should improve. The stopes in back of this level are worth from 101. to 121. per fathom. —**Harvey's Lode:** In the 114 west the lode is still somewhat unsettled; worth from 51. to 61. per fm. This level east is worth from 101. per fathom, and we hope will further improve. We have four stopes on this lode varying in value from 81. to 151. per fathom. The 90 west is worth 51. per fathom. This level west, on north part, is worth 141. per fathom. The stopes in back of this level are worth 121. per fathom. The tribute pitches, on the whole, are turning out about their usual quantities of ore. The shaftmen have completed the bob-plat at the 7; we shall now fix same with as little delay as possible, and resume sinking the shaft below the 114.

GOODEVERE.—R. Knott, April 25: Engine-Shaft: The lode in the 10 east end is about 1 ft. wide, but of no value at present; the ground is a little easier in the cross-cut, which is being driven south to prove the promising part of this mining property, which stands unexplored in that direction, and where, we believe, there are excellent chances of discovering and laying open other valuable lodes. —**Rugby Shaft:** The lode in the 10 east end is large, and presenting a masterly appearance, with two well-defined walls, and producing tin. I am looking forward to soon being able to report to you a good discovery at this point of operation.

GREAT WEST CHIVERTON.—John Curtis, April 24: The lode in the rise in the 10 is 2 ft. wide, with good stones of lead and muddle, but not enough to value; price for rising, 21. 15s. per fathom. In the winze the lode is split in branches, with occasional stones of lead; we have about 4 fms. between the rise and winze, and as soon as this is holed we shall commence sinking the engine-shaft to the 20, which will be in about two or three weeks from this time. From the kindly nature of the lode in the 10 I think the 20 will be a good level.

GREEN HURTH.—Jas. Polignac, April 19: The 44 end north is worth 3 tons per fathom. The stope in the back of the 44 is worth 3½ tons per fathom. The 44 end south is without change. The stope in the bottom of Standage level is worth 2 tons per fathom. No. 1 winze is worth 3 tons per fathom. No. 2 winze is worth 3 tons per fathom. East end from Standage is without change. The stopes in the back of the 30 are yielding a little ore. The end south from Robinson's sump on No. 2 vein is producing good stones of lead. Trial drive is worth ½ ton per fathom. Dressing going on well.

HAREHOPE HILL.—George Robson, April 21: Sinking was resumed on the evening of April 16, after opening No. 2 drift (6 ft. by 6 ft. 2 ins.), and putting on new windrose to bottom set. Last night after changing a bucket in the bottom set the pumping-engine was carelessly attempted to be re-started, before a check under balance-quadrant was removed, and the consequence was the fracture of sole plates on plunger blocks of both quadrants. To save time we shall try to patch up the defects to endeavour to re-commence sinking before the new sole plates ordered can be put in. Total depth of shaft nearly 56 fathoms.

HEALEY FELD.—J. Trelease, April 19: Since my last report to you the lode in the end at the Success level has rather improved in appearance, the strata around it is more freely intermixed with good spots of lead and iron pyrites, which, I think, are evidences of our getting into the same productive run of ground that our tributers are working on in the main Horse level above. In the drive south of the east cross-cut, at the Success level, we have stoped the ore up to the plat. We are now putting a rise up through the shale to prove the sill above. The vein has a strong powerful appearance at this point. The stopes on Eddy's strings are yielding respectively 7 and 9 cwt. of lead per fathom, ground easy for stoping. The end north on Eddy's strings is at present poor, the lode is twinned up, but undoubtedly it will again improve when we get through the hard compact sandstone. I have placed two men to prepare for driving through to the Whimsey level from the incline top. The sill below have been very productive for lead ore, consequently we must prove the sill above where I think we will open out some fair tribute ground if the ground is properly developed. We have seven partnerships of men employed on tribute. Their stopes yield respectively 10, 12, 14, 16, 8, 9, and 13 cwt. of lead per fathom. We have sampled 30 tons of ore this week, and are briskly getting another parcel ready for market. The weather is very favourable for dressing now, and we have a good supply of water.

HINGTON DOWN.—Thomas Richards, April 25: The engine-shaft has been sunk during the past week, by nine men, 3½ ft.; total depth below the 40 fm. level, 3½ fms. The ground is favourable, and very good progress is being made. The 40 east, by four men, has been driven 3½ ft.; total distance from the shaft 11 fms. 0 ft. 6 in. The lode is large; the part being carried (4½ ft. wide) contains capel, quartz, muddle, peach, &c., and a little copper ore. The 25, east of the cross-cut, on No. 2 lode, by two men, has been driven 2 ft.; the lode is composed of capel, quartz, and muddle, and occasional stones of copper ore.

KILFERETH.—John Mitchell, Joseph Tamblin, April 20: Engine-Shaft: Our sumpmen having finished dividing and casing the shaft to the 70, we commenced to draw away the debris from the said level last night, and intend to resume driving west next week. The lode in the 50 end west is worth 201. per fathom. Having holed the rise just behind the end with the 40 winze above we are now stoping the ends of the same, which are worth 151. per fathom each end. The lode in this level east is worth 71. per fathom. Two stopes in the back are worth 201. and 151. per fathom respectively. The lode in the 30 end east is looking very kindly, producing little tin and copper ore. The stopes in the back are worth 121. per fathom. The lode in the rise 11 fms. east is worth 51. per fathom. One stope in the bottom is worth 71. per fathom. —**Harvey's Shaft:** The lode in the 40 west is worth 61. per fathom. Four stopes in the back of this level—two west of cross-course are worth 2.1. per fathom, and two east of cross-course are worth 101. per fathom each. The other bargains are much the same as last reported.

KIT HILL GREAT CONSOLS.—Isaac Richards, April 26: At the tunnel level the ground is more favourable, 1 fm. 3 ft. having been driven during the past week. In the north engine-shaft, sinking below the 75, the lode is 3 ft. wide, and yields a little good copper and tin ore. The distance from the shaft to the 75 is 2 ft. 6 in. In the 75 west of the north shaft the lode is 4 ft. wide, of a very promising character, and is yielding a little tin ore. In the 75, east of the north shaft, the lode is 3 ft. wide, containing good stones of copper ore. The distance driven at these two points of operation during the past week is 6 ft. In the 48, east of the north shaft, the lode is from 3 to 4 ft. wide, composed of capel and quartz, with peach, muddle, and a little good quality copper ore. The men at the 48 and 24, west of the north shaft, have been removed at a cross-cut at the 75 east, and another north at the 62 east have been commenced for intersection of lodes known to exist in both of these directions. The machinery throughout the mine is in good condition and working well.

LANGFORD.—R. Goldsworthy, April 25: Saturday being setting when the following bargains were set:—To drive the 50 east, by six men, at 51. per fm.; 30 ft. wide, composed of capel, friable spar, spots of muddle, and copper. To drive the 50 west, by six men, at 51. per fathom; the lode is disordered by a small slide or flooke branch crossing it, no doubt as the end is extended it will improve. To drive the 50 cross-cut south, by six men, at 81. per fathom. To take out the side of the level for 9 ft. wide and 10 ft. long for plat as per bargain 51. The bargain to stop the 40 is not set. To drive the 30 fm. level cross-cut north, by four men, at 61. 10s. per fathom; all the joints are coated with muddle, which proves the ground to be congenial for the production of mineral. In the eastern cross-cut we have intersected a branch just the distance, where we expected to cut the lode. I now purpose to drive a few fathoms on its course to prove its size and character; this is set to six men, at 31. per fathom.

LEADHILLS.—T. Newbigging, April 16: Lead ore assayed, 64 tons 14 cwt. Pig-lead made, 408 bars=20 tons 8 cwt. per fathom.

LEADHILLS.—T. Newbigging, April 23: Lead ore dressed, 53 tons 10 cwt. Pig-lead made, 403 bars=20 tons 6 cwt. per fathom. Pig-lead sold, 1201 bars=60 tons 1 cwt.

LANDEGLA.—H. Hotchkiss, April 25: The sinking of the new shaft is going on very satisfactorily, having sunk 5 ft. in the last nine days. There is no change calling for special remarks in the character of the ground or the lode.

MARK VALLEY.—Wm. George, April 26: Salisbury Shaft: There is no alteration in this part of the mine. —**Wheel Jenkin:** The different bargains here are yielding quite equal to what they were reported at the meeting. Stamps are being erected with all possible speed. Saturday being our setting a full report shall be sent next week.

MELLANEAR.—John Gilber, April 25: The ground continues to be strongly mineralised, and is still very favourable for driving in the 30 cross-cut south of Gundry's shaft. In the 70 cross-cut, north of main lode, east of Gundry's shaft, the ground is kindly in appearance, and the men are making fair progress. In the 100, driving west of shaft on the main part, the lode is 5 ft. wide, and yielding 2 tons of ore per fathom, but the ground is a little harder. The lode in the 110, driving east of shaft on main part, is 4 ft. wide, yielding some saving work for copper and tin, and looking promising for an improvement. The lode in the 110, driving east of shaft on south part, is 6 ft. wide, yielding 3 tons of copper ore per fathom, and some saving work for tin—a very strong-looking lode, but harder than usual. In the 120, driving east of shaft on the main part, the lode is 4 ft. wide, yielding 2 tons of ore per fathom, and letting out an increased quantity of water. In the winze in the bottom of the 60, on the south-east part, the lode is 3 ft. wide, and yielding 3½ tons of ore per fathom. The lode in the rise in the back of the 80, west of Gundry's shaft, is 5 ft. wide, and yielding 2½ tons of ore per fathom. The lode in the rise in the back of the 120, driving east of shaft, is 3 ft. wide, yielding 1 ton of ore per fathom, and the ground is a little easier. In the 90, driving east from the old engine-shaft, the lode is 2 ft. wide, and yielding occasional stones of copper ore. The lode in the 110, driving west from the old engine-shaft, is 5 ft. wide, yielding good stones of copper and tin ore, and letting out a large stream of water from the north side of the level. We believe there is more lode standing in that direction, which we shall prove as soon as possible. There are 10 pitches let to 27 men at an average tribute of 9s. in 11.

MID-DEVON COPPER.—J. Neill, April 21: A Shaft: Water is now 12½ ft. below the 70, wheel working at 4½ revolutions. A delay of 11 hours occurred on Sunday, caused by a rod breaking. Machinery has worked well since.—**C Shaft:** 45 stope, east of shaft, worked by three men, has improved in yield of ore; the deposit intersected in the western end is embedded in very promising strata, the run is apparently extending westwards, and the ore is black and yellow of good quality. The stope from the rise of 50, worked by three men, and one boy, is intermixed with a very great deal of chlorite and hornblende. All the joints and fissures in the strata are coated with ore indicating strongly the probabilities of a good deposit somewhere near. At present it yields ore chiefly yellow in paying quantities. The 50 cross-cut north driven 1 ft. 1 in. by six men intersected a good bunch of ore in early part of week, to test which I put the men to cut into it on each side of cross-cut; it has yielded fair quantities of yellow ore, and it extends east and west. I shall again resume the cross-cut on Monday, as it is also producing ore and should improve. The ore-ground passed through will be available for stoping after cross-cut has further advanced. Ore raised during week 2 tons 15 cwt.

MONA CONSOLS.—W. Bawden, April 28: Our shaft is harder than usual, and the branches of the lode appear to diverge; it underlies south, and is getting a little larger. Yesterday we took some stones of ore out of the lode or branches of good quality.

MOUNTS BAY CONSOLS.—Capt. W. Argall, J. James, J. Rowe, W. H. Argall, April 18: Trebarvah: In the 50 cross-cut, driving south-west of engine-shaft, we are still in congenial ground, but not letting out so much water as formerly; still, we are having grains of copper, muddle, and copper to intersect in a suffer killa. There are three or four known good copper lodes to intersect in this direction, and anyone of which may repay us for the expense of cross-cutting. We have one pair of tributers in the back of the 62, west of Richard's shaft, at 13s. 4d. in 11; the lode is worth 61. per fathom. Another pitch in the back of the 50, west of Richard's shaft, at 13s. 4d. in 11; is worth 51. per fm. On a cross branch at the 30, west of engine-shaft, we have during the past week broken some good stones of tin, but whether of a lasting nature we cannot as yet say. We are preparing another parcel of copper ore to be sold next month.

had been advanced 10 ft. during the week, the ground having become harder; this long drift has now been nearly completed. The ore body at the Home Ticket is again reported as increasing slightly in quantity and quality. The shipments of ore for the week from this mine were 70 tons, besides 7 tons tribute ore from the Dunderberg. The telegram received this week again advises heavy snow, which has considerably retarded operations.

Phoenix United, 2½ to 3; on Monday 55 tons of tin were sold at 155. 15s. per ton, and it is reported that the mine continues to look well.

In Lead Mine Shares there has been scarcely any business doing, and quotations are altogether nominal. Roman Gravels, 8½ to 9½; the 110 south is worth 2½ to 3 tons of lead ore per fathom, the 95 south is worth 4 to 5 tons per fathom, and the 80 south worth about 5 tons per fathom. The monthly sampling, which has taken place this week, is 300 tons of lead ore. The quantity sampled last month was 250 tons. The annual general meeting will be held on Thursday next.

Tankerville Great Consols, ½ to ¾; the manager's report shows the extent of operations now in progress, and the necessary heavy expenditure going on for the efficient development of the property.

Leadhills, 2½ to 3; finer weather having now set in better progress is being made for the dressing of lead ores, and the various improvements now being carried on in extending the dressing-floors. The sale of lead, to which allusion was made at the last meeting of shareholders, is now, it appears, being realised, and it is expected that the directors will shortly declare a dividend of the amount then named—about 4s. per share.

Capt. W. Tregay, of Redruth, is said to be inspecting mines in North Africa, on behalf of an influential firm in the City.

The Stock and Share Auction Company have declared a dividend for the three months at the rate of 10 per cent. per annum.

Mr. J. Macdonald Cameron, F.C.S., &c., of the Chemical and Metallurgical Laboratory, Lime-street, has returned from Tunis, North Africa, where he has been engaged for the past two months in examining the mineral resources of certain portions of that country.

Mr. Justice Chitty on Tuesday made an order for the winding-up of the Devon and Cornwall Electric Light and Power Company, on the petition of Mr. H. Whorlow.

The Scottish Amicable Life Assurance Society directors' report to be presented at the meeting on Thursday next, states that during the year ended Dec 31 they received and considered 926 proposals for insurance, amounting in all to £28,994. These applications resulted in 772 policies being issued and taken up, assuring the capital sum of £508,594; the new premiums on which—including 9979. 17s. 9d. of single payments—amounted to £23,818 14s. 9d. In addition to this the sum of £285. 1s. 7d. was received for annuities granted during the year. The gross accumulated and invested funds amounted at Dec 31 to £2,465,955. 15s. 3d., the net to £2,405,650. 9s. 2d., and the annual income to £365,201. 2s. 8d. The total assets on the society's books at Dec. 31 last amounted to £683,194. 16s. 3d., under 14,186 policies. The directors have great satisfaction in again reporting an increase in the amount of new business effected.

COAL.—Messrs. ARNOLD, KARBURG, and Co., Hongkong (March 19), write:—The market has been very quiet during last fortnight, little disposition being shown on the part of buyers to operate at all, in consequence of the large supplies expected by sailing vessels from Australia. Cardiff coal to arrive is rather unobtainable, whereas spot cargo continues to be sold as high as £10.50. Australian produce is nominally worth £6.75 to £7. Sales have been—300 tons Australian ex Mount Lebanon, to arrive, on private terms; 950 tons Australian per Magnat, £6.75, to arrive; 1000 tons Takasima lump ex Benalder at £5.50; and 500 tons dust at £4.50. Arrivals since last report—2160 tons from Cardiff, sold to arrive; 1512 tons from Newcastle, N. S. W. sold to arrive; 1500 tons from Nagasaki, sold to arrive; 2961 tons from Newcastle, N. S. W. sold to arrive; 1853 tons from Cardiff, sold to arrive; 2400 tons from Nagasaki, part for sale; and 650 tons from Nagasaki, for sale.

GOLD AND SILVER.—Messrs. PEXLEY and ABELL (April 26) write:—Continental orders for gold have not only absorbed all the arrivals of gold, but also 199,000. In Dutch coin, withdrawn from the Bank, and the demand still continues. The Pekin has brought 3440. from the East, and the Taranaki £2,000. from New Zealand. The Neva has taken 6170. to Brazil, and the Ganges 4000. to Bombay.—SILVER: After a further slight decline, making the price 50½d., the markets have been very quiet during the week, the amounts on offer having been limited. The Donau has bought 8000. from New York. The P. and O. steamer has taken 75,000. to India.

MINERAL WEALTH OF COLORADO.—THE CALIFORNIA GOLD MINE.—An unintentional error was made in last week's *Mining Journal* in stating that the Hon. N. Sands is a director and the resident superintendent of the California Gold Mine Company (Limited). Mr. Sands is the resident director of the Kohinoor and Donaldson Company, but Mr. Alfred Rickard is the resident engineer and manager of the California Mine.

JAVALI COMPANY.—The half-yearly general meeting of shareholders was held at the offices of the company yesterday. A full report of the proceedings will appear in our next week's *Mining Journal*.

ORION DIAMOND MINING COMPANY.—The half-yearly meeting of shareholders was held at the Cannon-street Hotel yesterday, Mr. Harry Mosenthal in the chair. The Chairman expressed his regret that the report presented was not of a more favourable character, and said that the great competition and the very considerable fall in the price of diamonds have prevented the success which would otherwise have attended the company's operations. He anticipates the best results from the amalgamation of the different diamond mining companies, which is now being carried out, and which, no doubt, will shortly be completed. A full report will appear in next week's *Journal*.

LORDS' DUES AND PERCENTAGE ON PROFITS.—At the South Wheal Frances general meeting Mr. Peter Watson—one of the largest shareholders—made some important and pointed remarks with regard to the royalty question, stating it as his firm conviction that the time was fast approaching when the royalties on minerals would be abolished, and in place thereof a percentage paid to the lords on the profits made, with a fair and reasonable compensation for ground used or damaged. The general feeling of the numerous shareholders present was quite in accord with Mr. Watson's remarks, and there can be no doubt this is fast becoming a question for the consideration of all who are interested in the development of our mineral wealth, and is of such importance that nothing short of legislative interference will adequately meet the question.

NEDENES.—There have been shipped this week for the Tyne from these mines about 50 tons of copper ore and a small parcel of regulus—a very early beginning for the new company, and tending forcibly to confirm our reference last week to the importance of this property. The mines have already yielded copper to a large amount, and there is a great extent of profitable ground laid open, worth from 3 to 8 tons of copper ore per fathom. They are in the best possible position for returning immense returns, there being an extensive and valuable plant of machinery erected, and with the addition of boring machinery about to be adopted, and raising the produce to a high percentage by an efficient and cheap process of roasting and calcining, the results will be of a highly satisfactory nature. With regard to this latter point, about 70 tons of rough undressed ore from these mines were lately operated on at Messrs. Pontifex and Wood's Works at Millwall, and although not properly calcined they gave a regulus of 15 per cent., and Mr. Napier, their manager, reports:—"I can confidently say that if properly sorted at the mine and burnt in open hearths so as to burn off about two thirds of the sulphur, that ores of 4 per cent. could be made to yield a regulus of from 20 to 25 per cent. of copper, with an expenditure of not more than 10s. per ton. of ore treated. No ores could be better suited for blast-furnace smelting than these; the slag resulting from this smelting should not contain more than 1 per cent. of copper." Mr. Napier further states that to smelt 250 to 300 tons weekly would require four furnaces, at a cost of about 3000. altogether. We have only to point to the splendid profits being annually divided by other similar undertakings, such as the Tharsis, Rio Tinto, Mason and Barry, Cape Copper, Panulillo, Copiapo, &c., and the very high value their shares command in the market, to show what may be expected from Nedenes.

BRATSBURG.—The managers estimate the value of the copper ore now on the dressing-floors at about 10,000., and they add that the mines continue to look exceedingly well. It is, therefore, believed that in due course the company will be able to pay a good dividend out of profits for the six months ending April 30. The traffic on

the lake will be resumed next month. It must be remembered that all this continues to be done without any of the new machinery, which is expected to be ready about August. After that the returns and profits will be greatly increased. The ore ground already opened, it is estimated, will yield a profit equal to the whole capital of the company.

DEVON FRIENDSHIP.—The 42 fm. levels are worth 15½. and 20½. each respectively. The new dressing machinery is nearly finished. We understand that the subscriptions to the mortgage loan are now only about 12000. short of the minimum of 60000., and as about 200 of the shareholders have yet done nothing, it rests with them to make up this comparatively small balance without delay. It cannot be expected that a few will do all, and the others should see that it is to their own personal interests that the full sum should be subscribed at once, as it would greatly increase the market value of their present holdings. Already, at the mere prospect of the required sum being shortly obtained, the shares have doubled in value in the last fortnight, with every probability of doubling again when the above matter is completed.

NEW VAN CONSOLS AND GLYN.—It is announced that Capt. James Roach has resigned his position of manager of these mines and that his resignation has been accepted by the directors. Capt. H. B. Vercoe will now superintend the working, assisted by Capt. Douglas, who will reside on the property and carry out his instructions. It is hoped this change will prove satisfactory to the proprietors.

PRINCE OF WALES SLATE QUARRY (Carnarvonshire).—With the more favourable weather the sinking of the shaft is making better progress. It is intended to drive a level across the vein for the purpose of opening a chamber for slate-making, as soon as the shaft is sunk 15 yards deeper.

EAST BOTALLACK.—The new Balleswidened lode maintains its full value, and it is reported by the agents this week that the shaft has been sunk 6 ft. with the same character of lode as above, and what is most noteworthy is the fact that in sinking all the ground to the east has been stoped as far as the old workers could possibly follow without machinery to fork the water. Great hopes are now entertained of this property.

CARN CAMBORNE.—These shares have been in strong demand, and close 1½ to 1¾. In the 95 the south lode is from 4 to 5 ft. wide, yielding fluorspar, and rich copper ore; the lode is vertical and full of vugs. In the 40 fm. level west the north lode is 5 ft. wide, composed of blende, copper, quartz, and chlorite, and indicates the proximity of a large body of ore. On the whole, the prospects of this mine have considerably improved, and from its proximity to Dolcoath (which its adjoins), it is thought that it can hardly fail to prove rich on further development.

PRICES OF METALS.—Messrs. Vivian, Younger, and Bond have published a handsome sheet, showing the prices for the first day of each month for the last ten years of manufactured copper, Indian sizes, Chili bars, g.o.b.'s, Straits tin, and common coke tin-plates. The stocks and deliveries of copper and tin each month for the same period are also shown.

PHOSPHATES OF LIME.—It is expected that towards the close of the present year a work on "Earthy Minerals and Mining," by Mr. D. C. Davies, of Oswestry, will be published by Messrs. Crosby Lockwood and Co. The conditions under which phosphate of lime occurs in strata of all ages in the different countries of the world will be explained, with many particulars as to cost and methods of mining, and the whole will be illustrated by sections and maps. It may be added that a considerable portion of the descriptions are given from the personal observations of the author.

A FRENCH GENTLEMAN (age 42), acquainted with the Coal Trade, having most extensive connections and best references, wishes to REPRESENT, in Paris or any French Seaport Town, a good respectable ENGLISH FIRM. He would consent to take the Direction in England of the French Department for the Correspondence and Sale.

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50 Corporation of South 20 Frongoch, 22s. 6d. 50 Kapanga, 14s. 6d.
Australian Copper, 40 Goginian, 12s. 50 Old Shepherds, 33s. 9
17s. 6d. 100 Guinea Coast Gold, 3s. 6d. 50 Pen-yr-Osred, 17s.
50 Calao Bis, 1/8s. 6d. 25 Great Holway, 24½. 100 Festarens, 3s. 3d.
100 Colombian Hyd., 6s. 3 60 Herodsfoot, 6s., c. p. 150 Ross Grande, 2s. 3d.
50 Carnarvon Gt. Consols 13s. 6d. 100 Lucian Trevelyan, 5s. 100 Rhodes Reef, 5s.
200 Consolidated, 3s. 6d. 100 Indian Consol., 5s. 100 South Carleton, £30.
20 Carn Camborne. 10 Lake Valley of Swit- 25 Tamar, 15s.
10 Devala Central, 4s. 3d. zerland, £5 fully 25 Torke Pen. Ord., 4s 6
20 E. Carnarvon, 20s., c. p. paid, £3 7s. 6d.
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100 Colombian Gold, 6s. 6 100 Mona Consols, 15s. 50 Parya Corporation, 5s.
100 Chontales, 7s. 3d. 15 Mounts Bay. 25 Tolima A.
100 Devon Friend., 7s. 6d 50 New W. Caradon, 7s. 25 do., B.
50 East Blue Hills, 6s. 3d 100 Nouveau Monde, 7s. 3 100 Victoria (Gold).
50 East Graven Moor. 50 Old Shepherds. 50 West Lisburne, 2s.
50 Eberhardt, 8s. 100 Parya Copper, 4s. 3d. 50 West Devon Con., 5s 6
50 Herodsfoot, 7s. 3. c. p. 50 Potosi, 17s. 6d. 50 call paid.
50 Herodsfoot, 7s. 3. c. p. 100 Prince Wales, 9s. c. p. 100 West Crebor, 8s. call
10 Home Mines Trust, 100 Sortridge, 3s. 9d. 50 Wheal Crebor, 1½.
£1½.
Mr. TAYLOR's recommendations have been very successful and profitable to his
clients of late, and he still advises the purchase of
VICTORIA GOLD (Venezuela) for a rapid rise in price, owing to large and
influential buying. He undertakes to deal at the closest market prices of the
day.

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75 Birdseye Creek, £1 8 6 30 Frontino, 42 6s. 3d. 60 Parya Corporation, 5s
30 Calao Bis, £1 5s. 40 Home Mines Tr., 22s 6 40 Ruby, £1 7s. 6d.
75 Colombian Gold, £1 5s. 100 Kapanga, 13s. 9d. 100 Richmond, £7 2s. 6d.
50 Corporation of South 40 Leadhills, £2 15s. 150 Sortridge Consols, 3s 3
Australian Copper, 30 Langford Silver, 8s. 3 100 Tankerville, 4s. 9d.
22s. 6d. 25 La Plata, 16s. 3d. 50 Tresavean, 25s.
30 Calao Bis, 16s. 3d. 50 Mounts Bay, 15s. 30 Uni. Mexican, £3 15s.
25 Chile Gold, 17s. 6d. 75 Marke Valley, 22s. 15 Van, 25½.
150 Chontales, 7s. 100 Nouveau Monde, 7s. 6 150 Victoria Gold.
Colorado, £4 3s. 9d. 75 New W. Caradon, 7s. 6 75 West Crebor, 8s. 6d.
75 Drakeville, 6s. 3d. 40 New Emma, £2 15s 50 West Devon, 2s.
50 Dev. Friendship, 6s. 9 30 Organce Gold, 35s. 9 20 Wheal Crebor, £1 17 6
75 East Blue Hills, 7s. 6 40 Old Shepherds, £1 2s 6 25 Western Andes Gold,
50 Eberhardt, 8s. 6d. 30 Orta, fully pd., £1 7 8 25%
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ready. Price 1s., free to clients.

BUYER OF TOLIMA A and B SHARES.
PROFITS FOR FEBRUARY.—Tolima, £3373; Colombian Hydraulic, £775.
TOLIMA.—By the mail just arrived the profits for February are advised as
£3373. This may appear a falling-off in the mine, but it is not really so when
all the facts are taken into consideration. For instance, it is not generally
known that the Frias Mine bears all the cost of working the Sabandija, and this
cost is regularly deducted from the month's profit before the return is given.
The Sabandija Mine has now nearly reached the depth where remunerative work-
ing commenced in Frias, and exhibits identical indications of great richness.
When the Frias is relieved of this charge, which will be shortly, now, the re-
turns from the mines will appear to much more advantage.

Again, during February there was a scarcity of water for hauling ore to sur-
face, and the construction of the Clara's ditch to remedy this will in future, and
to keep up a constant supply of water for other purposes as well, has with exten-
sive surface operations, materially added to the month's cost. The gross return
for January is in excess of that for February, but the cost for the former month
is less by \$1000 than for the latter. Even if the mine never gave a larger monthly
profit than that for February, it would be paying over £40,000 a year net profit,
which is not a bad return on a capital of £100,000, but the Frias alone could do
better than that, and even as it is the net profits derived from the working
during the first two months of the year has secured the payment for the current
year of the whole of the cumulative preferential dividend of 10 per cent. on the
A shares, and about one-third of a similar payment, which the B shares became
then entitled to, and this, independent of any amount previously in hand, and
with both mines' working to the good.

Shares in Home, Foreign, and Colonial mines, bought and sold at net market
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Deals in all descriptions of STOCKS and SHARES at close market prices.
W. TREGELLAS strongly recommends the purchase of GOLD HILL MINE
shares at present prices.

Date.	Mines.	LEAD ORES.	Tons.	Price per ton.	Purchasers.	
Apr. 24—	Fordale	120	£10	0	Adam Eytan.	
25—	Pierrefitte	80	20	15	0	Nevill, Druce, & Co.
26—	ditto	65	16	10	0	Richards, Power, & Co.
—	Van	120	9	15	6	Walker, Parker, & Co.
—	ditto	40	9	18	6	ditto
—	ditto	40	9	18	6	Goodhart and Co.

Date.	Mine.	Tons c. g. lb.	Per ton.	Amount.	Purchasers	
Apr. 23—	Phoenix United	25	0	0	250 15 0	—

The London market opened for the month at 937, and steadily advanced to 981; but has since declined, and closes at 967. 10s. In Holland, the opening prices were 57 fl. for Banca, 56 fl. for Billiton. Our last advices, dated March 23, were 58½ fl. Billiton on spot; 59 fl. for June delivery; 59½ fl. for Banca on spot. The regular bi-monthly Banca sale went at 58½ fl., equal to about 977 in Holland or 981 in London. The European deliveries are reported as 1350 tons in London and 500 tons in Holland, latter exclusive of about 50 tons shipped to the United States. The new shipments are reported as 1150 tons from Australia and 1500 tons from the East Indies; 150 of the former, and 300 of the latter being for the United States: 400 tons are also reported as having been shipped to the United States from London stocks, making the total London deliveries 1750 tons. As we are now entering on the season of small shipments and large consumption, we must expect for many months to come, a steady improvement in the statistical position; and as the

unfavourable influences which have operated against the market, are of a temporary nature, while the real strength of the position will undoubtedly remain a permanent feature, it is difficult to see how the natural result, a material advance in price can be avoided for any great length of time.

Below we give the stocks, on spot or afloat, for Europe and America. For the European statistics we are indebted to Messrs. W. T. Sargent and Sons, London:—

	1883.	1882.	1881.
Mar. 31.	Mar. 31.	Mar. 31.	Mar. 31.
Foreign tin in London and landing ...Tons	5,578	8,114	8,672
Straits afloat for London { including }	2,200	970	450
Australian ditto { wire advices }	1,440	1,805	1,670
Bancoa warrants in Holland	1,425	1,573	1,497
Billiton in Holland	2,560	967	1,683
Billiton afloat for Holland	825	700	800
Other foreign in Holland	15	12	—
Stock in America and quantity afloat	3,123	2,770	3,760
Total	17,166	16,911	18,532
Trading Company's reserves of unsold Banca:—			
Stock in Holland	2,130	1,894	1,670
Floating for Holland	675	1,032	199
Price of Straits and Australian tin, New York 21 st ..	24 th ..	24 th ..	20 th ..
ditto ditto London	£96 th ..	£107 th ..	£88 th ..

New York, April 1.

EDWARD P. WHITE AND CO.

THE PANAMA CANAL.—Although comparatively little is heard with respect to the progress of the Panama Canal, yet it appears that the work is being most energetically pushed forward, especially at Mount Culabra, the highest point on the Isthmus, upwards of 900 ft. above the sea level, and 15 miles from Panama. At the entrance of the canal—or at least what will be—there has been erected a number of houses of huts for the men, so that there is a town to start with, and which will be enlarged from time to time for near to it at the present time there are upwards of 2000 persons employed, with workshops, sheds, machinery, and all the necessary appliances connected with the carrying out of the vast scheme. The company, which has a capital of \$60,000,000, is paying about \$500,000 a month in wages, and this large sum being spent on the place, so that great numbers of persons are attracted to the place to participate in the distribution of so much money, either as traders or workers. A vast sum of money is also spent in the purchase of machinery in Europe and America, more particularly the latter. M. Ferdinand de Lesseps is the controlling mind, and he is assisted by his son Charles de Lesseps, the Vice-president of the company, and M. Dinger, a French engineer, as director-general of works. One thing is evident, there appears to be no lack of capital, for the machinery, including powerful excavators worked by steam-power, are being put down. The number of workmen is increasing, the difficulties which were so striking at first are fast disappearing, so that the joining of the two oceans is merely a question of a few years, for the Panama Canal must become a great fact, whatever may be said to the contrary.

POTENTITE EXPLOSION.—The report of Capt. J. P. Cundill, R.A. Government Inspector of Explosives, upon the accident at the potentite factory at Conscough Bridge Lancashire, has just been issued. The accident killed three boys. It appears that potentite is powdered gunotton impregnated with saltpetre. The supposition that the explosion was caused by friction or percussion seems the most probable one, and is borne out by various circumstances, and by the experience of other explosions under similar circumstances. With regard to the amount of blame to be attached to those concerned, the Inspector thinks that the company were to blame in allowing three boys to work together subject only to the occasional visits of the manager and foreman, who had, of course, many other matters demanding their attention in other parts of the factory. It is true that it was not, technically speaking, a danger building, and that the operation, when conducted with care and obedience to orders, could not be called a dangerous one, but in face of the known inclination of the boys to tamper with the machinery, and the stringent orders which had to be issued on that point (though these orders were partly annulled by Mr. Sharp's unwise orders as to reversing the machine) the Inspector thinks that the more care should have been taken to ensure the observance of such orders by the supervision of a grown-up person. The neglect to report accidents as required by the Act appears to have been habitual, and with regard to this the Inspector states that on May 24, 1882, the factory was inspected by Col. Majendie, accompanied by himself, and a statement was made to them that no accidents had occurred there. This statement, if not actually made by Mr. Bell, was admittedly made with his cognisance, and thus not only did he neglect to report accidents which he perfectly well knew should have been reported, but he was at least a party to wilful misrepresentation of facts. His conduct in this matter is deserving of the severest reprobation. Had these minor accidents been duly reported and enquired into, it is possible that precautions might have been adopted which would have prevented the present disaster. It cannot be too strongly impressed upon all concerned that the Home Department considers it important to insist upon the strictest obedience to the letter and to the spirit of section 63. No accident, however slight in appearance, should be passed over; and such minor accidents are often really much more instructive, and give greater breadth of knowledge and experience, than those which have more serious consequences. In the one case the facts can generally be established by direct personal evidence; in the other, when all present are killed, the evidence is necessarily to a great extent inferential and circumstantial. The present case is a striking instance of this, for the knowledge of the facts of the accident occurring in the previous week, as narrated by those present, gives the strongest reasons for conclusion as to the cause of the fatal accident where no witnesses survived.

INSTITUTE OF ENGINEERS AND SHIPBUILDERS IN SCOTLAND.—The volume of Transactions just issued contains the discussion on Mr. Robert Duncan's paper "On an Expansive Engine Reversing by Valve"; Mr. L. J. Groves' paper "On the Exhaust Steam Injector"; and Mr. James M. Gale's paper "On the Latest Additions to the Loch Katrine Waterworks." The several papers are as usual accompanied by the diagrams necessary for rendering the authors' descriptions clear and intelligible in every particular. The Institution appears to be making very satisfactory progress.

INSTITUTION OF MECHANICAL ENGINEERS.—The January number of the Proceedings which has just been issued embraces the 36th annual report of the Council. Prof. Abel's report on further experiments bearing upon the question of the condition in which carbon exists in steel; Prof. Hughes' paper "On the Molecular Rigidity of Tempered Steel"; Mr. Charles Cochrane's paper "On the Working of Blast-Furnaces with Special Reference to the Analysis of the Escaping Gases, and Mr. E. Wendelstein's paper "On the St. Gothard Tunnel."

OFFICIAL DIRECTORY AND ALMANAC OF AUSTRALIA.—The amount of information contained in the new edition—that for 1883—of this annual is really enormous. Calendar, nautical ephemeris, tide tables for New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia; mean places of stars, weights and measures, interest and discount tables, and various other details met with only in the best classes of almanacs are found in this; but in addition there is much that may really be almost called encyclopaedia matter—a manual of gardening operations, a paper on the geographical features of the several colonies, accounts of the parliaments and government departments, a paper on the commercial intercourse and general trading prospects of Australia, and so on. But perhaps the most interesting sections of the volume are that entitled Commerce in Detail, which gives concise and ably written descriptive notices of various commercial establishments, and those on the Mineral Products and Mining Laws of the several colonies. That the Official Directory and Almanac of Australia (which it should be stated is edited by the proprietor—Mr. Edward Greville)—and published by Mr. George Robertson, of Sydney and London) is beyond comparison the best work of the kind published

in Australia, and it would be difficult to find many successful competitors even in England; it reflects the highest credit upon all concerned in its production.

REPORT FROM CORNWALL.

April 26.—It is gratifying to find that there is at length a real improvement in the general mining outlook, doubtful as the immediate prospects of several important individual concerns may be. By all appearance we may look forward for the next few months to a steady and substantial improvement, with fewer drawbacks to mar the advantages gained than we have been unfortunately accustomed to of late. And this, under all the circumstances, is really the best that we can hope for.

We are glad to find that the Mining Institute has grappled with the mine lease and dues question boldly, and that it has been decided to call a meeting of all interested, so that joint action may be taken in the name and on behalf of the county against the condition of the law which has made the Dolcoath and South Caradon action possible. If mining is ever to hold up its head again, and not simply to "exist" by sufferance at the mere irresponsible will of lords or their agents, a move must be made, and the mining interest generally is under a deep debt of gratitude to Mr. Peter Watson for giving the final impulse to the demand for immediate action by his manly and able speech at South Frances. That is the spirit in which this matter must be dealt with. The time has gone by for anything but the very plainest of plain speaking, and nothing in the shape of compromise of principle must be listened to. If you have a grievance and state it plainly and boldly the Legislature must in the end redress it. If you do not know what you want, or fail to make your purpose clearly evident, no aid can be expected. What is wanted now is the settlement of affairs upon a basis that will last; patching in the end would be worse than useless.

Jigging has been more than once suggested as an improvement on the ordinary method of tin dressing, and, indeed, it has been tried, but without very much success. There seems, however, very good reason to believe that, if properly managed, success may be attained. This is the view taken by Mr. Argall, of Duchy and Peru, who read a capital paper "On Continuous Jigging Machinery" at this week's meeting of the Mining Institute.

Mr. Argall classified continuous jiggers as "side," "under," and "central piston" jiggers. In the under piston jigger the piston works directly under the sieve, so that only one compartment was required; the concentrated ore, however, having to pass through a piston by a valve, or equivalent means, serious complications were introduced which considerably impaired the value of the machine. The machine used at the Duchy Mine was the central piston jigger, the piston being in the centre of the hatch and in free communication with a sieve at each side. Recently, by a slight modification, they had succeeded in jigging different sizes of ore in one machine at the same time; that was through a No. 33 (Cornish gauge) perforated bottom on one side of the piston and No. 25 on the other side. It would thus be seen that one piston was made to concentrate the ores on two sieves simultaneously, which might or might not be of different sizes—in fact, to do the work of two machines with an expenditure of power very little in excess of what would be required for one. The machines were fed from a revolving classifier. Classification of the material to be operated was really the secret of good dressing, no matter what method might be adopted for separating the ores. It was most important to have the particles of ore forming the feed for each sieve as near as possible of uniform size, and the nearer the ores to be separated approached each other in specific gravity, the more thorough must this classification be carried out. The best means of classifying was the revolving cylindrical sieve. Although continuous jigging had been generally adopted as a method of treating comparatively rough ores, yet it was gradually being utilised as a cheap and efficient method of dressing very fine material. It was a recognised principle in dressing ore to extract all the pure ore in as large grains as possible, returning concentrated dredge or mixed ore to be reduced to a finer state preparatory to re-treatment. To reduce all the ore to this fine state of division in the first operation meant a loss of ore as slime and a loss of power. Assuming the tin occurred in comparatively rough grains, and the ore was stamped to pass through grates—the holes in which correspond to the average size of the grains of tin ore—there would be no difficulty whatever in classifying and jigging this material direct from the stamps, the concentrated ore going direct to the tin-house or calciner, and the dredge being returned to a small stamp, or pulveriser, to be still further reduced. Supposing the tin occurred in very small grains it was highly probable that a stamping through, say, No. 20 grate and jigging the material, a large quantity of waste containing no tin, or not sufficient to pay for extraction, would be soon got rid of, and at a very small cost. He hoped some of the mines would erect a small jigging plant to treat the rough grain tin from the stamps, believing that the system by reason of its merit would soon work its way through the intermediate sizes to the very finest grain tin. It had been often remarked that Cornwall was greatly behind the rest of the world in dressing machinery. He was not prepared to admit this statement as a whole, but he was of opinion that if the continuous jigging system was now introduced and properly taken up by the mining men the next decade would see a greater revolution than any previous one to which Cornishmen had contributed in reference to dressing plants.

The miners in the West have been duly cautioned as to the danger under the new Explosives Act of the unlawful possession of dynamite, &c., not that there is the slightest reason to anticipate an improper use of it on their part; but that certainly there has been some amount of looseness of practice in not returning cartridges to store, and at times in employing them to break up the boulders met with in clearing the land.

TRADE IN SOUTH WALES.

April 27.—The Steam Coal Trade in the past week at the principal Channel ports maintains its recent activity, and the only difficulty shippers encounter is in facilities to get away their coal. The large amount of 146,339 tons has been sent away from Cardiff to foreign ports; Newport, 34,226 tons foreign and 19,187 coastwise; Swansea, 21,596 tons foreign and 9903 coastwise. Prices range from 9s. 3d. to 11s. 6d. per ton.

The Iron and Steel Trades are a trifle healthier as regards orders, but prices remain low. From Cardiff 1592 tons have been sent away, and several large parcels from Newport, including 1086 tons to Algou Bay, 2102 to Baltimore, 460 to Arica, 420 to Sundswall, and 360 to Gelle. Iron ore has arrived at Cardiff to the extent of 3670 tons from Bilbao, and 1018 from other sources; Newport has received 6145 tons from Bilbao, and 6555 from other sources. The price is from 13s. 6d. to 14s., with a weak demand.

Tin-plates are about 3d. lower since last report, and now stand at 15s. 9d. per box for good coke-mades, while charcoal-mades are from 19s. to 20s. Two more mills are reported to have been stopped at Ystalyfera, and the Pontardulais Works are again at a standstill. The whole town of Swansea is suffering from a depression of trade consequent upon the sad condition of the tin-plate trade. The intention of the tin-plate "ring" is to bring down the price of the box to 13s., if possible. Manufacturers are making great exertions to show what can be done in the way of producing thin sheets. Messrs. E. P. and W. Baldwin will exhibit at the forthcoming Amsterdam Exhibition plates of such extraordinary thinness and good finish that they are believed to excel anything which has previously been produced. The first book contains 25 sheets, 28 by 10 in., measuring in the aggregate 7000 superficial inches, and weighing only 4 lbs., or equal to 18 lbs. of 225 sheets (14 in. by 10). This book is no thicker than if it were made of good toned paper, and is properly bound and edged, the exact thickness of each sheet being .0024 of an inch. The second book is slightly thicker, but not so long. It consists of 31 sheets, 18 by 12 in., and contains 6700 square inches, weighing 4 lbs. 7½ ozs., the thickness of each sheet being .0037 of an inch. It would take 225 sheets, measuring 14 in. by 10 in., to weigh 20½ lbs. In addition to these remarkable productions there are a number of

other samples of this iron rolled into sheets, for which there is a large demand in Germany, France, and American markets for photographic purposes. In addition to these are 72 plates of different sizes and gauges, showing the quality of the sheets as taken direct from the mill, together with a number of samples of tin-plates, steel-plates, button iron in various stages—pickled, cold, rolled, and close annealed; also, remarkable testings of sheets and bars. There are also specimens of stampings made from tin-plates and sheets supplied by Messrs. Baldwin.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

April 26.—The drop in Earl Dudley's furnace and forge coal of 1s per ton, as determined upon last week, will leave the former at 10s. and the latter at 9s. per ton at the pits. Slack will also fall 6d. Pending the reduction, which, according to the present decision, will come into force on the 1st prox., consumers of manufacturing coal are declining to enter the market, or except in those instances where vendors consent to take orders at prices based upon the official reduction. These instances are less numerous than would happen were it not for the colliers' agitation referred to further on. The prices of iron are unsettled consequent upon the alteration in coal, but it is scarcely likely that there will be much change in this department. Indeed, the ironmasters are this week almost unanimous in pronouncing that there is no room for further ease either in the pig or manufactured branch. But buyers are in no great hurry to believe this. Best pigs remain at present at 65s., and common pigs at 40s., easy. Best bars are unaltered at 71. 10s. Sheets, doubles, are 87. 5s. upwards, and ladders 97. 5s. and on.

The colliers are attempting an agitation to resist the reduction of 4d. "per day" or stint in the Thick Coal seams, and 2d. "per day" or stint in the Thin Coal seams, which will follow upon the drop in coal. But it is not likely that it will lead to much difficulty. Meetings of the men have been held in various parts of the district, at which such resolutions as the following have been passed:—"That the action taken by the Committee of the Coal Trade is unjust, uncalled for, and unnecessary at the present time, and that we do not accept any reduction of wages until there has been a full meeting of the Coal Trade and the men's representatives."

At a quarterly meeting of the Midland Counties Federation of Miners, held in Wolverhampton on Tuesday, a motion was carried expressing the opinion that the reduction was unwise, "seeing that the wages of the workmen are already too low, and that the reduction will not in any way assist the employers, but will tend to reckless and ruinous competition, which is already too keen." It was also resolved—"That this meeting, having learnt that the meeting of employers held in Birmingham on the 19th inst. was not a full meeting of the trade, as a number of the coalmasters of the district were absent when the workmen's representatives were introduced to the meeting, we request the employers to call a full meeting of the trade at once to fully discuss the question." Whether such second meeting of the trade will be held is at present uncertain. It is not considered likely, however, that it would result in any departure from the decision arrived at a week ago.

As Change closed in Birmingham this afternoon it became known that it is practically arranged for a meeting of coalmasters to be held at Wolverhampton next Wednesday to again consider the miners' wages question, and the men will be asked to continue work subject to the decision of the meeting. It was reported on Change that the Cannock Chase coalowners will not reduce quotations on May 1.

Like those of South Staffordshire, the wages of the colliers of North Staffordshire are to come down. At a recent meeting of the coal and ironstone masters of the latter district held at Hanley, it was resolved, after a full discussion, to give 14 days' notice from the 28th inst. for a reduction of wages. It was agreed that the amount of the drop should be 15 per cent.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

April 26.—There has been but little change of late in regard to mining or the production of iron in Derbyshire, the trade altogether being satisfactory. Lead mining appears to be pursued steadily, for there are few companies to make startling announcements as to discoveries about to be made that are likely to yield fabulous sums. Steady and straightforward is evidently the motto of the mine-owners in the Peak and the adjoining districts of Derbyshire, so that there are few disappointments met with. Only a moderate tonnage of ironstone is raised in the county, so that the number of persons engaged in this mining branch is considerably less than was formerly the case. This is not in consequence of less iron being made—there having, in fact, been a marked increase of late years—but owing to the development of the oolitic ores in Northamptonshire, Lincolnshire, &c., which, it would appear, can be imported at as low a cost as the local stone could be raised, whilst the former is, perhaps, rather richer in metallic iron and more silicious. It produces, however, good quality of pig, either for foundry or forge purposes, and considerable quantities of it are sent into Staffordshire for rolling, and also to Sheffield for different purposes. A good deal, however, is now being required for the local works, more especially the Staveley, Stanton, and Clay Cross foundries.

The work of removing the steel plant from Dronfield to Working-ton has been going on for some time, and not much is now left to be done, and the place will soon be a mere wreck of its former state. There will, of course, still be the works of the Messrs. Lucas that find employment for a good many hands, but there will be left a great many uninhabited houses and shops that will be anything but cheering to those who remain. The coal trade has kept up well, owing to the state of the weather, for we do not appear as yet to have got out of the regions of frost and snow. Business with London has been rather active as regards house coal, more especially for the Clay Cross, Grassmoor, Blackwell, Pilsley, Pinxton, Eckington, and Langley Mill collieries, and prices to consumers have not gone down, the charge, delivered, being 24s. per ton. It is not quite clear why this rate is maintained, seeing that there has been a reduction as regards the sea-borne coal, which not so long since was 3s. per ton more than the inland, whilst the difference between the two is now only 1s. per ton. Steam coal is looking better, although there are difficulties in the way of disposing of all that is produced. The ironworks consume a large tonnage, and the same may be said as regards some of the railway companies, but there is a vast quantity left over after the supply of those sources of consumption. Kiveton Park and Shire Oaks, as well as one or two other places, are able to send to the Humber, but the other collieries are unable to reach a seaport within a moderate distance, and at what may be called a moderate rate. In coal required by manufacturers the business doing is not moderate, and less is being required for gas-making purposes.

In Sheffield trade taken altogether is what may be called good, and in some branches there is marked activity, owing to the heavy orders in hand, so that the full resources of some of the largest establishments have been called into requisition. Foremost just now stands the manufacture of armour-plates, of steel and iron, and in these there is plenty doing, and some branches have been given up, so that more attention can be paid to the former. Ship and boiler plates have also been in fair demand, and the mills have been working well on sheets and wire. This being the busy season for sheep-shears the output is large, and there appears to be plenty doing in edge tools, files, and similar material. Most of the cutlery houses are doing well in table and other knives, and the same remark equally applies to razor makers. The production of both Bessemer and cast-steel has been large, and of the former a considerable proportion is converted into rails, although there is scarcely so much keenness in competing for orders, seeing that the low price at which contracts have been taken would not pay the Sheffield makers, who are handicapped with a heavy railway rate for reaching a shipping place in any direction. A considerable quantity of crucible steel continues to be required for wheels, axles, and tyres, as well as for mining and other tools. The engine-works are fairly employed, and so are the machinists, especially those engaged in mining appliances. The make of iron in the district is by no means large, so that a good deal has to be imported, so greatly enhancing its cost.

In the South Yorkshire mining district more than usual quietness

prevails, the men being fairly employed. The question of limiting the production appears to have been quietly dropped, even by those who were the most vehement agitators for it, for one scarcely ever hears it even mentioned.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

April 25.—There are two redeeming features to add to my rather gloomy report of the condition of the North Wales Slate Trade last week. The first is that there are not enough of ships at Portmadoc to convey the required exports of slates, and, secondly, that the London and North-Western Railway are constructing docks at the port of Conwy to accommodate the slate traffic brought over their lines from the Festiniog and Dolwyddelan districts. We have all but completed our journey around the coast of Wales. We left off near the town and port of Cardigan. South of this point there are the slate quarries (which have never done much good) of Abereddy Bay and St. Bride's. Then we turn eastward and come to the Pembrokehire coalfield. Then to the lime rocks of Gower. Then to the busy iron, tin, copper, and chemical works of Swansea, Neath, and Burry Port. Then we skirt the Glamorganshire coal field, with its vast trade. Then a run through the lias rocks near Bridgend and the new red sandstone and permian between this point and Cardiff brings us to the last named port. A further run of 12 miles lands us at Newport, Monmouthshire, the great outlet for the coal of Monmouthshire, and so our journey is completed. The little principality of Wales has a mineral production worth about 10,000,000 per year, and its inhabitants are an industrious, honest, a loyal and peaceable people.

TRADE OF THE TYNE AND WEAR.

April 24.—There has been considerable activity in business generally during the past week here. The demand for coal, coke, iron, chemicals, and all the staple products of the district has been considerable, and large shipments have been made. As to best large steam coal the price is well maintained, but no advance has taken place of consequence; but for contracts or forward delivery present rates will not be taken. There is an excellent demand for steam, small, and also for house coal at present. On the whole, the prospect for the Northumberland steam coal trade is certainly improving, and when the Baltic is fully opened ample work may be expected in the district. In Durham there is still a good demand for gas coal, for house, and also coking coal. It is true that owing to bad weather at sea some stocks of gas coal have been made, but so far those stocks are only of trifling consequence. Screened nut coal is in excellent demand. Manufacturing coal continues in request. There is a good demand for coke for shipment, and also for the iron furnaces in Cleveland and this locality generally. On the West Coast the demand for coke from this district is scarcely so good, as owing to the heavy charges for railway carriage the Cumberland ironmasters find the price of this coke a heavy burden on them. The Cumberland coalmasters are also exerting themselves to produce coke in that field which will smelt the iron in that district. Some of the coal seams in Cumberland produce fair coke for this purpose when the coal is crushed and washed before the coking process, and this system is being gradually extended. At Dearham Colliery, near Maryport, the best Thick coal seam has been nearly exhausted, but some good Thin seams still remain, and some of those seams produce fair coke. The owner of this colliery, however, has been so fortunate as to secure 300 acres of royalty lying to the south-east of the old workings, and the Thick coal, which is 6 ft. 6 in. in thickness remains entire here. Two new shafts are to be sunk immediately for the purpose of working this valuable coal.

The business at Tyne Dock has been very heavy during the past week. The shipments of coal were nearly 100,000 tons, an increase of 13,000 tons on the quantity shipped in the corresponding week of last year. The large shipments of the past few weeks have caused this year's figures to compare very favourably with those for the same period of last year, and the prospect at present is good. Coke shipments have been rather limited of late, but they are improving. The imports have also been heavy, consisting of timber for collieries, iron ore, &c. On the whole, the chemical trade has improved considerably in these rivers during the present year, and better prices have been secured for bleaching powder and other products. It has now been resolved to restrict the production of chemicals in this district. All the makers on the Tyne have adopted the proposed regulations without exception. It is intended that the production shall be reduced from May 16 by about 10 per cent. The present production of bleaching powder is about 130,000 tons annually, so that upwards of 1000 tons will be removed from the market by restriction. It is not yet decided whether the production of soda will be reduced, but the price of this has advanced lately. The Tyne Chemical Company, the largest works of the kind in the world, has not paid a dividend for some years, but it is expected that one will be paid shortly.

The Iron Trade has been steady during the past week; there has been a much better tone. There have been very heavy shipments of pig metal; it is expected that these shipments will exceed the shipments of last month by about 15,000 tons. A large reduction of stocks is anticipated by the ironmasters, and improved prices are also anticipated. Of course a great deal depends upon the Scotch market, which is liable to great fluctuations. The iron markets throughout the country are, of course, nothing to boast of at present, so far as prices are concerned, but the Cleveland trade, both in crude and finished iron, is quite as good as any other at present. Prices of pig metal certainly continue low all round. There is no change of importance in the price of any kind of iron since last week; the price of coals and coke for iron-making also remains without change of consequence. The reduction in the make of manufactured iron and pig-iron is beginning to have an injurious effect on the work of the iron ore miners in Cleveland. A commencement has been made at some works in reducing the number of hands. Nearly 50 men have been paid off at the mines of Stevenson, Jacques, and Co., and the men at the Skinningrove and Craggs Hail Mines have been put on short time—five days per week. The same course will be taken at some of the other mines shortly.

At Middlesbrough on Tuesday the market has been quiet; there was no change of consequence in prices. No. 3 is still sold at 40s. per ton; this is the basis. The stock of warrants in Messrs. Connal's stores has been reduced 1135 tons, the present stock being 79,721 tons. A large reduction in stocks in the month is anticipated, chiefly owing to large shipments. There have been heavy deliveries this month both of pig-iron and manufactured iron and steel. It is expected that a large business will be done on the Tees in the manufacture of salt, and that extensive chemical works will be established there shortly. Manufactured iron has been steady at bars 67; ship-plates, 67. 6s. to 67. 7s. 6d. The cessation of work on Mondays is now general throughout the district. Coke is in good request on the Tees at 9s. 6d. to 10s. 6d. at the ovens.

The salt deposits on the Tees continue to attract prominent attention. About 150 gentlemen connected with the allied industries of Cleveland visited the saltworks of Messrs. Bell Brothers on Saturday afternoon. On the visitors arriving at Port Clarence Mr. T. H. Bell led the party to the reservoir, where brine is delivered from the bore-hole, and afterwards to the bore-hole itself, where they were shown the coves brought up during the process of boring the hole. Mr. Bell pointed out the various geological strata, after which the pumping machinery in motion was inspected, and a sample of the brine, which comes from a depth of 1100 ft., was drawn fresh from the bore-hole. It contained 23 per cent. of salt. The party was then conducted to a second bore-hole now in progress, and another hole is contemplated. A trial bore hole was then inspected, in which a quantity of marsh gas had collected which has ignited. Eleven pans are now at work here, and 350 tons of salt per week is produced, which is of excellent quality. At present the firm are considering how far they can utilise the waste heat from the blast-furnaces to evaporate the brine and make it into common salt. What was immediately occupying their attention was the use of brine as it came from the bore-hole for the purpose of making carbonate of soda, and it is hoped that works will be erected to utilise the brine in that form. It would not be the means of introducing an entirely new trade into the district, as Messrs. Sadler and Co. made carbonate of soda. On

the motion of Mr. E. F. Jones, President of the Cleveland Engineers, seconded by Mr. E. Gilks, of Stockton, a hearty vote of thanks was accorded to Mr. Bell for the instructive survey they had made.

Original Correspondence.

MINING ON LAKE MICHIGAN.

SIR.—The subjoined account of the Keel Ridge Mine, which is reported to have just lost its machinery by the falling in of 30 yards square some 1000 ft. deep, will be of general interest. The mine is a small but growing property. "The Keel Ridge Mine is situated in Michigan, and was referred to in 1881 as presenting some new features, all of an encouraging character. A new double shaft, with upright self-pumping balance skip-rod, has taken the place of old No. 2, and through it the entire product of the mine is raised to the surface. This shaft is now down 220 ft. from the collar to the present working level, which last is being prepared for stopping. This winze is located 30 ft. east of the shaft, under which last a drift from the winze is in rock—the shaft itself having been sunk all the way in rock, except the last lift of 60 ft. The occurrence of the same kind of rock 60 ft. below the bottom of the shaft, however, indicates nothing more than a probable change of dip or a mere bulge in the footwall. The wedge of rock, as well as the vein of red ore, has cut out altogether on the present working level, and there is now nothing but clean blue ore of the finest quality between the walls, if we except the rock under the bottom of the shaft, the relation of which to the ore body has not yet been determined. The dip is so nearly vertical that it is a question which is the foot, and which the hanging-wall, the ore now making rapidly under what was last year regarded as the footwall, and transforming it into the hanging.

The underground workings cover a length of 276 ft., the ore body being lens-shaped and narrowing down to a point in the east, and being cut squarely off by a horse or crossing of rock at the point of its greatest width at the west end. East of the shaft, which is located a little to the east of the centre of the workings, the ore body varies from 8 to 15 ft. in thickness, while on the west side it averages not less than 40 ft. The lens, if such it can properly be termed, is what the miners call a "chimney," which was only 20 ft. in length at the top, the ore appearing to pitch both east and west from the centre, so that it lengthens out rapidly in sinking. On the lower level the rock has, however, shoved in a little at the west end. The rock crossing at the west end has never been cut through, but a shaft was sunk 270 ft. west of the skip, and from it holes bored north and south, and nothing found but mixed ore and rock; so there is little promise of an extension of the ore body in that direction, though it is possible that the borings may not have cut the formation at a sufficient depth to settle that question conclusively. As it is, however, the mine presents a much more promising outlook than at this time last year, the ore body having gained very considerably both in length and breadth in sinking a single lift of 60 ft. The mine is being wrought on the modified Nevada plan, in rooms 20 ft. wide, leaving alternate pillars of ore 15 ft. thick. The double shaft and skip-rod is a most perfect piece of work, and we believe the only one of its kind in the region. Since work commenced the product has been 11,496 tons in 1880, which was increased to 19,011 tons in 1881, and to 23,425 tons in 1882, making a total of 53,932 tons. The mine is owned and wrought by the Emmett Mining Company, E. P. Foster being general agent, and J. T. Jones superintendent, with Capt. John Wicks in charge of the underground work. The plant of machinery consists of two Rochester duplex engines of the largest size, with two 6 ft. drums, and six 30 in. Fraser and Chalmers' drums, which last are used for sinking and drifting. About 11,000 tons of ore were raised during the winter months, while navigation on Lake Michigan was closed, and the chances are that a product of not less than 40,000 tons will be achieved the present year. The mine gives employment to a force of about 120 men."

Westminster, April 13.

COPPER MINES OF LAKE SUPERIOR—HOW THEY ARE WROUGHT AND DEVELOPED.

SIR.—Herewith I send a few extracts from the first of a series of papers by Prof. C. D. Lawton, M.E., believing that the items will be of interest to the readers of the *Mining Journal*. I may remark that the Professor is engaged compiling notes for the annual report of the Commissioner of Mines for this State (Michigan), so that I need not say that the facts given are quite reliable. It is gratifying to note, he observes, that the copper industry is in a fairly prosperous condition, and that the remarkable depression which unfortunately prevails in the iron business has as yet left the copper mines comparatively unaffected. Considerable uneasiness, however, prevails among those who are entrusted with the management of this interest regarding the future. The apprehension is entertained that the general dulness which prevails throughout the country, together with the greatly increased production of ingot copper, may so far affect the market value of that article as to reduce it below the price at which it can be mined. It must be borne in mind that, leaving out the Calumet and Hecla, the profits in copper mining on Lake Superior are, on the average, very moderate. With most of the companies that are operating mines, it is a constant struggle for existence; by the closest economy they are just able to make ends meet, and a few of them are hardly so fortunate as to achieve even this not over-ambitious result, but find it not infrequently necessary to call upon the anxious shareholders for funds to continue the work. Out of the 26 copper mines now working on company account on Lake Superior only five paid dividends in 1882, and these returned in this manner to their stockholders the sum of \$2,780,000. Two millions of this was paid by the Calumet and Hecla alone, \$440,000 by the Quincy, \$200,000 by the Osceola, \$80,000 by the Atlantic, and \$60,000 by the Central. Some of the others made money, which was used in increasing the mining plant, pushing the openings or expended in such a way as should afford greater facilities for future working.

No one, now-a-days, expects to open a copper mine on Lake Superior without a large preliminary expenditure of capital. It is frequently only by a large outlay that they can hope to succeed at all. The less the amount of copper contained in the rock, the more of the rock must be mined and stamped in order to secure a product that shall ensure the requisite income. A copper-bearing lode that yields only 20 lbs. or less of ingot copper to the ton of rock must be so worked that the cost of obtaining this 20 or less pounds shall at least not exceed the market value of the copper. Probably nowhere in the world is mining work in advance of that done in the copper region of Lake Superior. Its history is a history of progress. There has been no halting, no retrograde, but a constant advance. No improvement is lost sight of, every advantage is seized upon and rendered available, every appliance brought into requisition and turned to the best account. The crude methods of early days have been discarded, and the leading mines of this district are in the vanguard of the world's mining industry. The confidence and boldness with which mining work is undertaken, and the rapidity and success with which it is accomplished, is illustrated in the recent enterprise begun by the Tamarack Company. One year ago this company began the sinking of a downright shaft, which must extend, before its ultimate purpose is accomplished, more than 2000 ft. vertically into the earth. This final object is to reach the Calumet and Hecla conglomerate. From a careful study of the inclinations of the copper-bearing portion of this extraordinary lode, it is reasonably conjectured that beneath the surface of the land of the Tamarack Company it possesses a degree of richness that should amply compensate for all expenditure and risk incurred in the effort to reach it. Imbued with this faith the company does not hesitate, in the endeavour to accomplish it, and so well have they succeeded in the vigorous prosecution of the work under the direction of Capt. Daniels, that the shaft has already attained to the depth of 550 ft. from the surface. In addition to the satisfactory progress made in the work, the company has met with much to incite agreeable anticipations in the encouraging nature of the ground which has been passed through.

In an unusual degree it has proved copper-bearing, and one of these adventitious amygdaloid belts, that had been recently cut, proved so alluring that the company were nearly persuaded to linger on the way, and further explore this newly discovered treasure-house, which appeared to have hidden in its folds such a store of coveted riches.

In the early days of copper mining in this peninsula such an undertaking as the Tamarack would scarcely have been thought of, or it would have been possible to have succeeded. But all that has been changed; there is a new order of things. The power-drill—"Yankee miner," as the Cornishmen designate it—high explosives, the Ball's stamp-head, and the many other invaluable improvements that have been made, have resulted in revolutionising the mining industry, and in giving it an immense stride forward. Formerly it would not have been possible to have worked stamp deposits like the Atlantic and Osceola with any hope of a profit; but now with the increase of knowledge and appliances, such lodes in the majority of instances form the basis of all that it is expected to accomplish; great richness is not hoped for, they only require as far as can be ascertained a certainty of the extent and quality of the deposit, so that knowing what is possessed the problem of working resolves into what must be done in order to leave a small margin of profit.

The arguments which were used to convince capitalists of the value of mining shares and properties which were offered for sale were invariably embellished with statements of the profitable results obtained at the Minnesota and Cliff, and the inference not unfrequently made that like returns might be expected. But while failure resulted from the operations of nearly all of these locations, the profits afforded by the two mines claimed as representative demonstrated the great worth of at least a portion of the cupiferous deposits of the country; and this knowledge not only sustained the flagging hopes of many a forlorn mining enterprise, and stimulated to renewed endeavour to achieve success at many less promising mines, but also led to much extravagance in working, and no doubt to not a little deception in recommending stocks and properties for sale. In all estimates and considerations applicable to copper mining on Lake Superior this company should be excepted. Its experience is for its own instruction, and is of comparatively little value to other companies. No other company could undertake a tithe of its expenditure and survive. It "so far overshadows all other mines in the copper district in its expenditures, in its receipts, in the richness of lode, in the output of copper, and greatness of its profits, that there is no comparison to be made between it and the other mines."

The Calumet and Hecla is one of the world's mining phenomena. There is no other such a uniformly rich copper deposit known. The other Lake Superior companies, by the best of management and the closest economy, can just manage to exist. Some of them, more fortunate, congratulate themselves on being able to make, annually, a moderate dividend; but this great mine need take no thought of economy; in fact, as compared with its neighbour, the Osceola, it apparently does not. It regularly ships its thousands of tons product, and returns as regularly to its stockholders its millions in dividends. The few rich veins which have been found establishes the fact that such do exist, and it is the expectation of discovering such a store of wealth that stimulates to ever-renewed search and expenditure. The copper mines were never in better condition than now. They are more extensively opened, and show larger and richer stopes than were generally to be seen a year ago. If the price of copper is maintained at the point which it has lately held, a reasonably prosperous year may be looked for in the copper mines; but any considerable reduction in the market value of copper must result disastrously, if long continued, to many of the companies now operating.

Opechee, Mich., March 31.

J. DANIELL.

MINES IN THE CALLINGTON DISTRICT.

SIR.—I briefly referred last week to the improvement in New Holmby by intersecting a side lode, or it may be part of the original lode divided, or as old miners would say "took hoss" for it is no uncommon thing on the lead lode. I have known scores of tons of lead broken on a side lode, and in Kelly Bray I have known hundreds of tons of copper ore broken from a side lode that "took hoss"; it frequently occurs that the side lode makes the best deposits of ore, sometimes they hold a great length, and 30 or 40 fms. in depth before falling in its original course. I have seen some of the ore that was broken a few days since, it is what is known in the neighbourhood as bitch ore. They are also getting some very good lead, and the jiggers are working admirably. I never saw lead cleaned so clean before; we could not possibly clean it so clean with the old process. I see by assay the best parcel produced 78½ per cent. of lead and 42 ozs. of silver to the ton, and No. 2 63½ of lead and 37 ozs. of silver to the ton of jigged ore, and Redmoor assayed 81½ for lead and 40 ozs. of silver to the ton of dressed ore. There are several points in these mines, not mentioned above, opening up very satisfactory. The manager could put on 40 good able-bodied miners more, and give them good wages—men are getting very good wages in these mines, and they will have every encouragement he will set them for one, two, or six months, just as they choose. Wheel Lusky lode improving fast. The agents' report last week shows that the lode is from 7 to 8 ft. wide, with a leader 1½ ft. wide, composed of quartz, yellow and grey copper ore. Taking into consideration they will have from 60 to 70 fms. of backs by continuing the adit level, their prospects appear good.

Trebartha Lemanne is also a very promising young mine; we say young, so it is as far as machinery is concerned, but it was worked by the ancients 250 years ago, who sold a great many thousands of pounds worth of tin from the back of one of these lodes. I notice in the Share-list there has been no alteration made since its first insertion, since then I know there has been two 6d. and one 1s. calls. An outsider to see the agents' report, the work done with machinery on the ground, then to refer to the Share-list must at once see that there must be some mistake. I hope we shall soon see this trifling error put straight. The Silver Zone, the Birmingham and Harrowbarrow, Wheel Brothers, Silver Valley, and Langford have all got these silver lodes, and a great number of thousands of pounds worth of the ore has been returned from time to time; but the silver lodes differ from other lodes, as sometimes you might work on for months without seeing any signs of ore, then might strike on a deposit and well remunerate the party for their perseverance. I remember a case of this kind at Langford Mine, six men took on tribute for two months, the first six weeks they never saw any sign of silver, the next week they struck on a deposit, but they worked it all out by the end of the week, then their hearts failed them to try again. After paying their two months' cost they divided 132l. each. Such is the uncertainty tributers frequently see. Mine companies when they take up abandoned sets must not expect to see a course of ore as soon as the water is drained, particularly in silver mines. It is very possible that it is within a very few feet of a deposit, but to make sure of all the silver is to explore all the ground. JNO. BUCKINGHAM.

Callington, April 25.

[For remainder of Original Correspondence see this day's Supplement.]

BEDFORD UNITED.—The 42 east on the Bridge lode continues to be worth 15l., and as soon as the ground is available for stoping increased returns will result therefrom. The 62 fm. level east and west are being driven by 10 men, and it is expected that the ore part of the lode will be found nearer the shaft than in the levels above, and more valuable. The cross-course on the north lode has been intersected. This cross-course made the large deposits of ore on the Wheel Marquis lode, and it is confidently anticipated that as driving is advanced similar results will accrue.

TREASAYAN.—Those who are best informed continue to circulate very favourable reports as to the great progress that is being made at these mines. It will be seen from the reports on another page that Gooch's and Caddy's tin lodes will soon be seen at the 27 and 75, when very large reserves of tin ground will be opened out; the discovery of copper at so shallow a level as the 27 gives great hopes that large quantities of this mineral will be found in addition to the tin, meantime the monthly returns of tin are steadily increasing. Sufficient buddles have now been completed; 60 frames for dressing the slimes are now being laid down, and will soon be at work.

THE MINING DISTRICTS OF UTAH.

The geological formations of Utah, and the situation and peculiarities of the mining districts have been exhaustively treated of in an elaborate paper, received by last mail, by Dr. W. Bredemeyer, M.E., geologist, and U. S. surveyor. He states that most of the mining districts are situated in and confined to the two principal mountain ranges—the Wasatch and the Oquirrh—one on each side of the Jordan Valley, and nearly parallel to each other. The Wasatch range extends from the Territory of Idaho, or the northern boundary line of Utah to the Colorado River on the south, in a south-westerly direction through the central portion of Utah, and forming the division between the Great Salt Lake basin on the east, north-east, and the waters of the Colorado River on the south, south-west. The flanks of this range differ materially in their geological structure and appearance. The eastern flank is formed either by a series of broad terraces and plateaux, or the same appears in long waving ridges and slopes such as are peculiar to the apex of the coal formations. In the eastern flank we observe mainly the sandstones, shales, and limestones peculiar to the cretaceous and tertiary ages, in which appear the coal beds known in Utah Territory. The western flank of the Wasatch is very steep and abrupt, and comprises the older crystalline rocks of the Silurian, Devonian, and carboniferous ages in which appear the rich mineral deposits for which Utah is justly celebrated, amongst the treasures of the United States. The altitude of the Wasatch range varies between 8000 and 13,000 ft. above the level of the sea. It is also a peculiar phenomenon that the dislocations of the formations on the western flank are more numerous and extensive than those of the eastern. The Oquirrh range commences at the centre of the Great Salt Lake, and extends far into the southern part of the territory. The formations of this range are entirely of the rocks peculiar to the Silurian, Devonian, and carboniferous ages, and show a series of extensive breaks and faults. Both mountain ranges are crossed by powerful and extensive dykes of eruptive rock, representing principally syenites and dioritic porphyries. Besides the two before mentioned large and principal mountain ranges of Utah, are three others of lesser extent, and about the mineral wealth of which very little is yet known.

Going from Salt Lake City eastward the first mining district of note met with in the Wasatch range is the Uintah (Parley's Park) district, which begins about 30 miles east-south-east of Salt Lake City, and adjoins Big Cottonwood on the north and north-east side. The general geological structure is quartzite and calcareous shale of the carboniferous age, and in all probability overlying the granite which appears in the southern and south-eastern parts of the district. The veins appear first as true fissure veins, cutting through the strata, second as bed or strata veins lying between the strata and conforming to the course, foldings, and dislocations of the same. The gangue of the vein consists of brecciated material from the enclosing wall rock, together with quartz and earthy infiltrations and other silicious materials as result from said infiltrations. The ore in most of the mines is milling ore. There is smelting ore, however, appearing as carbonate and sulphate of lead. The milling ore appears as chloride, sulphides, and native silver. The Cottonwood districts commence about 14 miles south-east of Salt Lake City, and are situated in the highest portion of the Wasatch range, and from 9000 to 11,000 ft. above the level of the sea. Little Cottonwood canyon is a deep gorge 15 miles long. Big Cottonwood canyon splits itself into several forks, and is in the aggregate, with its different forks, over 40 miles long. The lower parts of the Cottonwoods cut through a large grand mass of granite, extending northerly and southerly, and rising in solemn awe-inspiring grandeur more than 12,000 ft. above the level of the ocean. The granite rises out of and above a mass of schist and crystalline rocks. Proceeding easterly up the canyon we observe a mass of coarse grained, in places, porphyritic rock, containing quartz veins with galena, copper, silver and antimony overlying the granite. We observe a mass of schist 1200 ft. in thickness, dipping east-north-east gradually, by Emma Hill north. Above the schist we observe about 300 ft. of crystalline lime, then 200 ft. of metamorphic sandstone, commonly known as quartzite; then a layer of schist varying in thickness from 20 to 40 ft., and crowning all is a mass of Silurian limestone nearly 2000 ft. in thickness.

Advancing further eastward is Virginia Mountain, a second mass of granite rising out of the schists, which schists are highly impregnated with copper. I say second mass because it is distinct from the first-mentioned mass of granite in points of age and upheaval. This second mass of granite has split the upper part of the canyon into a north and south fork. The presence of gneiss as boulders, the spurs of schist breaking through this granite, and the mass of granite itself being syenitic in structure and coarse grained indicate a more recent origin than that of the granite in the lower and western portion of the canyon. Passing along the wagon road from Alta to the Emma Mine another mass of granite—a fact which taken together with the other masses of granite should demonstrate beyond dispute that the granite underlies the whole of both districts. The formations belong to the Palaeozoic age, but for all that the specimens of algae and other fossils, found in the fetid lime of the Cottonwoods in reality belong to the Azoic, still the metamorphic action to which the rock has undoubtedly been subjected verifies the conclusion of a Palaeozoic origin. In the upper bed on Emma Hill the ore deposits appear as parallel or chimneys on the east or west line. In the lower or Emma ore belt the deposits appear as segregations or pseudo-morphic displacements on an extensive scale. Nature, in her curious and mysterious work, has caused here the different fissures so to run and join each other as to form to all appearance a well-defined strata vein, which in reality it is not. By close observation it will be seen that the ore does not occupy a real vein fissure, but that the mineral solutions circulating and ascending from below have entered into all and every open space of the extensively fissured rock, rooted in the same, dissolved the carbonates of lime and magnesia, and deposited in its place the mineral wealth as it is found at present. Big Cottonwood is merely a continuation of the Little Cottonwood formation northward, and it is in every principle a counterpart of the other, with the exception that its resources are greater and its scenery much grander.

The characteristic geological formation of the American Fork and Silver Lake mining district are the dolomite, schist, and quartzite of the Lower Silurian and Devonian periods. The same overlie the granite of Little Cottonwood on the eastern flank of the great granite ridge of Little Cottonwood. The Silurian and Devonian limestones overlie the quartzite, from which they are separated by a thin bed of schist, 10 to 40 ft. in thickness. These limestones appear in beds, and assume the most grotesque forms, ridges and spires, and represent a mass from 1000 to 2000 ft. in thickness. In the ravines of American Fork are met everywhere immense boulders, torn from their original bedding by the power and action of the ancient glaciers. Coming across the divide from the Little Cottonwood we observe a fracture in the rock of considerable extent. On the east side the schists to a thickness of from 1000 to 3000 ft. are predominant; on the west side the younger sandstones prevail. This line of fault can be distinctly traced all along from the divide down the canyon to within the vicinity of the Wild Dutchman Mine at Forest City, a distance of over five miles, crossing two mountain ranges. The country on either side of this fault is traversed by numerous fissure and strata veins, which are in turn interrupted and broken through by several extensive porphyry dykes. A great number of these deposits have been opened to a more or less extent, but in not one case beyond a depth of 800 ft., although in strikes some mines have drifted for more than 1000 ft. on the vein. The reason for the fact that these deposits have not been opened beyond a certain depth is to be found in the extensive dislocations which have found place here, and which are entirely foreign to most of the miners and mineowners of this district. There are two main lines of disturbance in this district, one break running north-west and south-east, carrying the western portion of the lodes downward, and another break running north and south diagonally to the first break, throwing the dislocated parts further downward. It is very suggestive to connect the dislocations of American Fork with the disturbances which found place during the time of the second upheaval, which are so plainly illustrated in those parts of Cottonwood around Emma and Patsy Morley Hills. Here we find beds of limestone and schist upon the granite, dipping at an angle of from 30° to 40° east, a long distance off from the

place from which they evidently were originally torn; which fact will lead us a step further, to suggest the presence of granite also in American Fork as underlying the sedimentary rock. The character of the ore of American Fork is the same as in the Cottonwoods. The geological formation of the Harrisburg mining district, which is 329 miles south-west of Salt Lake City, is stratified red and white marl-sandstone, at places greatly broken up and eroded; here and there the sandstone alternates with thin seams of clay-shale, the cementing material between the sandstone is lime; petrifications of trees, branches, leaves, and ferns, such as are peculiar to the coal formation, are everywhere in great abundance. I have not the slightest doubt but coal will be found in the vicinity. If we observe the large extinct volcanoes which occupy the centre and southern parts of Utah, together with the volcanic rock which appears here everywhere, we cannot be surprised at the foldings and contortions of the strata. The great plains bear conclusive evidence to the erosion which has taken place here. These beds of red and white sandstone, in particular the white sandstone, which is of a finer texture than the red, are impregnated with chloride of silver, carbonate, and iron. Some of the latter appears in nodules and assays very high in silver. The dissimilarity of the ore in these sandstone layers is so vast that a very careful sampling of all the material is a great necessity. The assay value varies from \$20 upwards. The San Francisco mining district is on the high dividing ridge between the Beaver Valley and the Wah Wah Valley; it is a short range, running north and south, called the San Francisco Mountains, having three principal summits. The northernmost and highest of these summits is composed of trachytes of volcanic origin, the middle one being granite, and the southernmost and lowest, called the Grampian Mountains, consists of the stratified sedimentary rocks, quartzite, and limestone. These sedimentary rocks were originally deposited under water in horizontal layers, or alternating strata of sandstone and limestone, which were transformed by great heat and pressure, the sandstone to quartzite, and the limestone to dolomitic marbles.

The Star district is situated in the Pioche Mountains, which is a low range in the south-eastern edge of the Utah and Nevada desert. This range is somewhat isolated in its position. The nearest principal business place is Minersville, 15 miles distant. Minersville is in Star district, Beaver county, Utah Territory, about 200 miles south-west of Salt Lake City, on the stage road from that city to Pioche, in the south-east part of Nevada. The geological structure of the Pioche range consists of belts of metamorphic shale, quartzite, and limestone, flanked on both sides by igneous rock, also porphyry, lava, and trap common to the interior ranges of the great basin and desert between the Sierra Nevada and the Wasatch Mountain. The metamorphic action on the shale, quartzite, and limestone beds was very intense, and is distinctly marked along the flanks of the range, and, in fact, here much more than in the centre. The general course of the strata is north and south, dipping east with 40° to 60°. My examination was confined to the North Camp district, across the mountains east and west. North Camp, or Shenandoah, is situated on the east flank of the mountain facing Beaver Valley. This magnesian limestone or dolomite belt is the chief mineral-bearing rocks on the east side of the mountain. The veins and ore deposits are more numerous and richer here than in the schists, quartzites, and porphyries. In this limestone belt the ore deposits appear first as fissures, veins crossing the beds north-east and south-west; second, as strata veins conforming entirely to the strikes and dips of the strata in general. The strata veins appear only in the centre of this limestone belt, running north and south, with dip east. The fissure veins run north-east and south-west, with a dip of 50° to 70° north-west. This shows that they cross the beds obliquely in a horizontal plane, and at right angles on their line of dip, as shown in the sections formed by Nature. The gash or cross veins here continue through the lime beds from the quartzite on the north to the slaty schist on the east. The Merrimac is a vein fissure, plainly traceable several hundred feet in the calcareous, slaty schist east of the limestone belt. There is every evidence that the vein fissures do penetrate into the quartzite east of the lime belt. The gash veins appear at intervals from 20 to 350 ft., parallel in course, and dip all along the course of the limestone beds, which proves that they belong to one family of fissures of contemporaneous ages. These veins are from 3 to 5 ft. wide; at such points where they cross the bed veins they form rich chambers of ores.

The Tintic mining district is situated in the Oquirrh range, about 75 miles south-south-west of Salt Lake City, and contains about 20 square miles. In the north-western part of the district, including the Eureka and Copperopolis Mines, the geological structure is limestone of the Silurian age. The limestone is considerably changed in its appearance by the great masses of eruptive or igneous rock. In the western portion of the district we observe at the base of the mountain quartzite. The ore in the north-west and western part of the district occurs in true fissures, bearing north-east and south-west with a very near vertical dip. There appear also numerous gash veins cutting the country rock in different directions, and so making the whole appear as a complete network of veins. The ores here are very rebellious, containing lead, copper, gold, silver, bismuth, arsenic, antimony, and pyrites of iron and copper, varying in value from \$20 to \$360 per ton. The veins are here and there barren, the ore appearing in pockets only. In the southern part of this district the mineral bearing formation is principally composed of hornblende, porphyry, syenitic, and felspar, porphyry containing kaolin. The mines on Eureka Hill appear in limestone; this limestone is tilted up, and the veins are situated between the beds of the same. The bearing is generally northerly and southerly, with a very near vertical dip eastward. The veins are irregular, both in strike and dimensions, and are accompanied by numerous spurs and so-called feeders. They are noted for the great value of their ores, containing a considerable percentage in silver, in combination with gold, lead, copper, arsenic, and antimony. The ore can be milled successfully by roasting in chloridising furnaces before amalgamation. The Julian Lane is a paying mine; the ore contains silver and bismuth. The Victor, Kohinoor, and California Mines are working on the same vein as the Julian Lane. All the mines in this district are more or less largely developed, and have good prospects for the future. The principal mines of the Camp Floyd mining district are situated around Lewiston, near the summit of and on the western flank of the Oquirrh range, and produce free milling ore, which appears in and is hereditary to a quartzite bed, which bed overlies the older limestone. This limestone composes the centre of the great upheaval in this part of the Oquirrh range. The lower part of the limestone overlies the shale and quartzite beds, and belongs with them to the Silurian age. By a close examination of the rock in the crushed quartzite, deposited together with the ore, it will appear that the ore forms in many cases only a coating of the fragments, the interior being more or less barren, which indicates the process of depositing ore continued also subsequent to the upheaval. There is no reason why impregnated beds formed by sublimation, as the above-mentioned ones, should not be as rich, valuable, and extensive as any other ore beds. Copper and other ores are found as impregnations in various countries, as in Germany, Japan, China, and California. Gold is found in China and Japan in beds of slate, which are also entirely impregnated with iron, copper, and lead sulphurets.

The Ophir and Rush Valley districts are situated on the western slope of the Oquirrh range, occupying a very large tract of ground of about 200 square miles. Rush Valley mining district commences at about 32 miles west south-west of Salt Lake City. Ophir mining district adjoins Rush Valley on the south-west line. The formation of country rock in these districts is principally limestone, which appears everywhere in strata, cliffs, reefs, and ledges. These strata of limestone dip with the slope of the hills towards the valley, losing their course gradually in the great upheaval. Last but not least comes the so-called Old Reliable, or West Mountain Mining district. This district commences about 22 miles south-west of Salt Lake City, and is situated on the eastern slopes of the Oquirrh range. The principal geological structure of the district is quartzite or vitreous sandstone, and dolomite or magnesian limestone. The quartzites appear in beds of great dimensions, with their seams or lamels of shale, which separate the strata at intervals of from 100 to 800 ft. In the southern, south-western, and south-eastern portions of the district, two beds of limestone from 100 to 800 ft. in thickness are

observable from the south-east in most irregular foldings and frequent dislocations of the strata, which at present show a general strike of north-east and south-west, and dip north-west at angles varying from 20° to 80°. In several of the breaks and faults, large dykes of dioritic and hornblende porphyries appear. They are extraordinary, frequent, and well-defined in the south-eastern and south-western parts of the district. The presence of these igneous rocks occupying the breaks of the strata, verifies the origin of such disturbances as have upheaved, folded, and broken the sedimentary beds. Ore deposits appear in this district. In the neighbouring district of Beaver Lake, formerly nearly abandoned, is a number of good looking copper claims. A few men who have adhered to the district have opened up a number of lodes from 1 to 6 ft. in width, carrying from 10 to 25 per cent. copper (mostly as oxides and carbonates), and a little gold and silver. These lodes lie at the base of the mountains, and are easily traced along the surface for hundreds of feet. Near by immense deposits of sulphurets and oxides are reported, averaging over 40 per cent. of the pure metals. Copper stain is frequently visible on the hillsides, and there is every probability that many lodes would be discovered, were proper search made, and that this section of Beaver County will become an important one for copper smelting. The great distance from railroads and the market, has hitherto prevented much attention being paid to this district, but the field appears a good one for future operations. For various reasons, such as scarcity of water, &c., little exploration has been done. Twelve miles west of Beaver City several veins of bismuth ore have been found. These lie near together in a magnesian limestone, of Silurian age, and vary from 1 to 9 ft. in thickness. The gangue is of a serpentinous character, and carries lime garnets, iron oxides, tremolite, and other minerals. The ore, a sulphide and oxide, free from arsenic and antimony, varies from 1 to 6 per cent. of the total vein matter, but is easily concentrated. In the concentrated product, which gave 39 per cent. of bismuth, molybdenum was found, which in view of the high price of that metal and its general use, may prove an important discovery.

At Coalville, six miles south of Echo, on the Union Pacific Railroads, is a number of seams of coal, from 1 ft. to 7 ft. in thickness. From these are produced large quantities of coal, used on the Union Pacific roads. A short narrow gauge railroad leads from this place to Echo. Experiments go to show that it is of a non-coking character, and hence of little use in connection with the smelting in this territory.

To the east, in Wyoming, are still further deposits of a similar character. South along the Wasatch coal has been found in various places and of varying character, but owing to the distance from railroads in few places has much of anything been done. Eighty to ninety miles south-west of this city, in and near the San Pete Valley, a number of seams, from 6 in. to 6½ ft. in thickness, of excellent bituminous coal has been found, while a little further to the east, among the mountains, others as wide as 10 or 12 ft. are being worked. These beds lie from 30 to 50 miles from a railroad, and nearly along the line of the proposed Denver Pacific. Already a narrow gauge road has been pushed up Spanish Fork, and this road will make them easily accessible. This coal yields a good quality of coke, which is being used at the furnaces in the Salt Lake Valley. Now it is delivered at the smelters several dollars cheaper than can the Connells-ville coke taken from Pennsylvania, and still yields a handsome profit. At the further beds mentioned is a large number of coking ovens turning out coke continually, of which a large stock is said to be on hand. Little need be said of the coal beds of Iron county, and thus far south, some of which are 12 ft. or more in thickness. These and many others not mentioned, and but little known—often chance discoveries—prove the presence of coal throughout the territory, and any future demand will be at once supplied either from them or many others to be found. In the San Pete Valley, in the sandstones and conglomerates with the coal, are beds of shales, containing jet, cozerite, and almost enough oily matter to burn alone, while in the vicinity are springs bringing to the surface considerable quantities of petroleum. Further to the north similar shales. In view of these facts it is not improbable to suppose that oil will be found upon search being made, and Utah may yet supply at least its own markets. About 15 or 20 miles below the railroad station at Salt Creek are seemingly inexhaustible quarries of salt and gypsum. The former, yielding 90 per cent. of the pure article, are being steadily worked, and a number of tons daily shipped to the Ontario mills for chloridising purposes. Of this article the territory furnishes almost any amount. Further to the south, along the flank of volcanic upheavals, extensive sulphur deposits have been unearthed. On these little work has been done. They are awaiting further railroad facilities. In the extreme north-eastern section of the county, within 50 miles of railroad, a copper district has been opened. The veins lying in micaceous shale, associated with porphyry, and varying from 2 to 20 ft. in width, appear to carry almost all of the ores of copper, but mainly the oxide and glance, which yields sometimes as high as 50 per cent. of the pure metal. The mines are considerably developed, and the prospects are exceedingly good. There also appears copper in Copper Gulch, San Francisco district, in Tintic, in Uintah, and in the granite range between Salt Lake and Ogden.

In view of the proximity to the railroad and of the fine country in which they lie, these districts bid fair to become important ones. Iron ore is found more or less throughout the territory, but notably in large quantities in certain places. Heretofore its use has been comparatively limited, being applied as a flux in the lead smelting business. To be sure even in this time its use has been by no means inconsiderable, and great was the saving when the expensive ores from Rawlins, Wyoming, was replaced by others from Tintic; but still scarcely any attempts have been made to work it for its iron, and so vast quantities of excellent ore remain unutilised. In the south-western part of the territory, in Iron County, is a range of mountains containing inexhaustible amounts of a fine oxide, and within 25 miles are large beds of coal. Their present remoteness from railroads renders them of but comparatively little value at present, but at the north, where good iron containing several per cent. of manganese is found.

But Utah's great product is silver-lead bullion, made from low grade ores at a close margin. The market lies in the East, where it has to compete with other ores and bullion. And when consideration is made that it has to ship its products over 1000 additional miles, paying, therefore, a freight tariff from four to six times that on the Eastern roads, and when we see its competition successful the conclusions as to its importance and value as a great lead region are at once drawn. The present furnaces are the finest in the country, using all the modern improvements—water jackets, excellent blowing machinery, and reduce from 20 to 100 tons each of ore a day. As only the best and most effective can live now, the old and small stacks are being replaced by new and larger ones, using all the modern improvements for economy. At present there are a dozen establishments using 25 stacks in operation, which turn out over 1560 tons of bullion per month.

METROPOLITAN MILLS.—The first annual meeting of the Metropolitan Mills was held at the City Terminus Hotel on Tuesday last—Mr. J. S. Balfour, M.P., in the chair. The Chairman congratulated the shareholders on the success which had attended the operations of the company, and called particular attention to the fact that, although the rice mill had only been in operation 10½ months and the oil mills for six months, they were paying a dividend of 8 per cent. for the whole year. They had purchased a large stock of the raw material at abnormally low prices, and the market had since improved, so that they had now the opportunity of making a considerable profit. The net profit of the year amounted to \$75,721, and the first thing that we desire is to set aside \$500, towards the gradual writing down of the leases. They proposed the payment of a further dividend at the rate of 6 per cent. per annum for the past half-year in addition that declared at the same rate for the six months ending September. The company had been managed with the greatest economy as well as success. The total expenses had been \$2011, leaving \$7501, as net profit, and after paying 296½ commission on profits payable to the manager, according to the Articles of Association, and allowing for the dividends, a balance of \$1193, remained to be carried forward, it being necessary to have a large sum in hand owing to the extensive character of the company's business, and which balance would go a good way towards a 6 per cent. dividend for the current year. The paid-up capital amounted to \$5,702½, consisting of 5332 shares, with 31,105, paid, and 6760 shares with 51, fully-paid. The report was adopted, and a dividend of 3 per cent., making 8 per cent. for the year, declared.

* THE TITLE-PAGE AND INDEX TO VOLUME LII, for the year 1883 was published in the Mining Journal of Jan. 20.

WATSON BROTHERS' MINING CIRCULAR.

WATSON BROTHERS,
MINEOWNERS STOCK AND SHARE DEALERS &c
1, ST MICHAEL'S ALLEY, CORNHILL, LONDON.

A full account of East Wheal Rose when in the height of its prosperity was published by Mr. Watson, F.G.S., in his "Gleanings among Mines and Miners," during a tour through Cornwall in 1846, only a few months before the mine was destroyed by a storm, the effect of which, from an eye-witness, was published in the Times about the middle of July, 1846. Mr. Watson was accompanied over the mine by one of the largest shareholders, also purser of the mine, the late Mr. Michell, and the head agent, Capt. Middleton, after whom the principal lode was named. The account there given may interest many now:—

"The first mine we visited in the neighbourhood of Truro was East Wheal Rose, where we spent several hours. It is not only the richest but the most extensive lead mine in England. The sett is two miles long on the course of the lodes (of which four are being worked), and one and a half miles from east to west. There are 16 principal shafts in course of sinking, and the works extend one mile in length underground. The deepest shaft is 99 fathoms, and expected to be at the 100 in about a fortnight. The original outlay by the shareholders did not exceed 6400*l.*, while the profits divided among them in the last four years amount to 143,360*l.* The machinery on the mine, consisting of six steam engines and every other requisite for working so enormous a concern is estimated to be worth 35,000*l.* The present returns are from 450 to 500 tons of lead per month, whilst the profits amount to 50,000*l.* per annum. Underground and at surface about 1100 persons are employed. The lodes here in many places are remarkably soft, bearing a resemblance to quicksand, and requiring to be boarded up to prevent the lead from being washed away. In the different levels there is quite a forest of Norway timber packed away, and the quantity now daily used is enormous, though we were not able to get at the exact number of loads. East Rose was originally worked on east and west lodes, and was about to be abandoned as a bad concern when a rich lode was discovered running north and south. The lead raised is not rich for silver, and yields about 15*l.* per ton. The value of the lode is about 3 ton or 7*l.* 10*s.* per fathom. A curious circumstance here is that the lodes occasionally form a junction and cross each other."

Mr. Watson also described all the ground about East Rose, which was then being worked as North Rose, Wheal Acland, Cargoll, Wheal Methir, Rose Consols, Rickard's Rose, and several others, none of which succeeded, though the names and situations of them naturally caused much attention to be directed to them, and shares in each went to a high premium.

In the year 1842 East Rose was very poor, shares valueless, and the works were about to be abandoned, when a "stroke of the pick" laid bare the rich lode referred to. In 1843 our attention was called to the mine, and after enquiry we introduced it to London. It was then in 128 shares, and the price 300*l.* One of the largest shareholders was Abel Lewis Gower, Governor of the Bank of England, and we sold his shares for him at 1200*l.* to 1500*l.* each, the latter being the highest price obtained.

We were connected with the mine from its first becoming rich to its practical destruction, which happened soon after Mr. Watson wrote the above particulars; for on Thursday, July 9, of the same year he visited it (viz., 1846) a water-spout broke over the mine, rushed in torrents down the shaft, and filled every level up to the 40. At this time there were 200 men underground, 40 of them perished, and from the soft nature of the ground in the mine the timbers gave way and the levels crushed in. It will thus be seen that before the accident the mine in the height of its prosperity returned nearly 500 tons of lead ore per month, and that this return yielded a profit of 50,000*l.* a year, the costs being between 3000*l.* and 4000*l.* a month. Since that time lead ore is down at least 5*l.* per ton, and the costs of working have increased, but assuming the latter to be the same 500 tons of ore per month, if the crushed levels can be drained and cleared, and that quantity obtained, would not give the profit that it did formerly.

Tresavean was visited and reported upon in the "Gleanings" the same week in 1846.

Old Shepherds was not at work; but was always looked upon as a fine speculation. One well-known agent in Cornwall frequently called our attention to it, many years ago, but not at the present price.

We cannot answer the other questions of our correspondents.

We are expecting every day to hear that the 102 ends, both east and west, at Prince of Wales are getting in the ore ground so rich in the 90 above, and referred to in our remarks a week or two ago. If the ore is met with as good as we have every reason to expect, the mine may take a prominent position. The present price of shares is no test whatever of the true value of the speculation. This also refers to many other *bona fide* speculations which have to stand upon their own merits and are quite neglected; while the general public have rushed after others that have been daily and extensively advertised, and puffed into almost every household in the kingdom.

The usual fee for inspecting a mine is 2*l.* 2*s.* and travelling expenses. For any mines we may recommend we will give an order to inspect at any time, even before purchase, if desired.

Wheal Crebor has paid 9750*l.* in dividends since 1880, and we hope will pay a good one at next meeting.

We read in a Cornish paper that the adventurers in South Frances never expected to be landed in such troublous seas as they have been during the last 12 months. Now, it is more than two years ago when the mine was paying dividends, and shares nearly treble the present price, that we called attention to its true position, and foretold just what has happened. What we said then, upon undoubted authority, was denied, and we were sadly abused for letting out the truth; but our friends, we are glad to say, sold out their shares.

COLORADO MINING ENTERPRISE—THE DANDY SILVER MINING COMPANY.—The prospectus of this enterprise, the property of which is located on Mount Princeton, about eight miles west of the town of Buena Vista, and consists of two full mining claims, each 300 by 1500 ft.—Butler's Dandy and the Encyclopedic. Mount Princeton is one of the highest mountains in Colorado, being over 14,000 ft. above sea level. These two mines are located on the east side of the mountain, the west line of the property being about 1800 ft. below the summit. The property is, therefore, several hundred feet above timber line. It is a fact well known to mining men that the richest silver mines in the world are situated at very high altitudes—most of them above the line of perpetual snow. The side lines of these mines—i.e., the sides of 1500 ft. in length, run north and south, the veins of this portion of the mountain running in the same general direction. There are six well-defined veins on the Dandy, the croppings showing at different places, and being traceable the whole length of the claim. There are probably the same number on the Encyclopedic, though this claim has not yet been sufficiently developed to enable us to give a perfectly accurate description of the veins on this mine. It is certain, however, that one of the veins on this claim shows free silver in the surface croppings. The veins on this mountain, unlike most of the veins in mining districts, can be seen with perfect distinctness and accuracy on the surface; the mineralised rock, and in many places the mineral itself, in the shape of galena, sulphurets, and free silver being found on the surface, so that the whole length and width of the vein can be traced on the surface as plainly as a railway track can be traced. On the present site of the shaft of the Dandy large pieces of black sulphurets were found within a few inches of the surface, which assayed all the way from 300 to 6000 ozs. of silver to the ton.

TO ENGINEERS, IRONFOUNDERS, CAPITALISTS, AND OTHERS.

FOR SALE.—

CHARLESTOWN IRONWORKS,

ST. AUUSTELL, CORNWALL.

The Trustees of the Estate of the late JAMES THOMAS, Deceased, INVITE TENDERS FOR THE PURCHASE, as a going concern, of all that IMPORTANT and VERY VALUABLE

IRON AND BRASS FOUNDRY,

Together with the appurtenances thereto, and the GOODWILL of the BUSINESS, established about 50 years since, and which has long enjoyed a widely-extended connection. The WORKS are situated at Charlestown, near St. Austell, and are known as the CHARLESTOWN IRONWORKS, and comprise the following WORKSHOPS and MACHINERY:—

FOUNDRY, HAMMER MILLS, FITTING, PLATING, SMITHS', MOULDING, PATTERN MAKERS' and other SHOPS, MACHINERY, large WATER WHEEL, &c. The machinery and appliances are in good condition, and comprise a 25 inch cylinder vertical STEAM ENGINE, with a 10 ton boiler, and all necessary gear for driving extensive machinery in the fitting shop, and also a blast fan. A superior WATER WHEEL, 30 feet diameter and 3 feet breast, made wholly of iron, with all the necessary gear for driving the same machinery driven by the steam engine. This wheel drives the machinery about nine months in the year, during which the cost of driving the steam engine is saved, the latter forming an important reserve of steam power available in times of extra pressure of work.

IN FITTING SHOPS—One heavy 21 inch compound Slide Lathe, three 14 inch Lathes, with Slide Rests, one 14 inch Lathe, one 10 inch ditto, with Slide Rests, a large heavy self-acting combined Planing and Drilling Machine, with Slide Rest, a good Shaping Machine, two Drilling Machines, a good self-acting Planing Machine, one screwing Machine, a large face Lathe, with face plate 7 feet 9 inches in diameter, and Slide Rest, a Cylinder Boring Machine, with a 11½ in. bar, and capable of boring a 70 inch cylinder, a 6½ inch Boring Bar, with Blocks, &c., for large lathes, a powerful Crane, with Blocks and Chain complete, and parts of a 30 inch cylinder Steam Engine, the cylinder and bottom of which are new. IN PLATING SHOP—Two Tilt Hammers driven by a 12 inch cylinder Horizontal Steam Engine, and 9 ton Boiler, and every other requisite for such a shop. IN SMITHS' SHOP and HAMMER MILL—A pair of Tilt Hammers and Shears driven by an Iron Water Wheel 16 feet diameter and 4 feet breast, Cranes, Forges, Blacking Mill, Boring Machine, &c.

IN MOULDING SHOP and DRYING HOUSE—Two powerful Cranes, three Cupolas, two of which are of large dimensions, large Stove, with iron doors and roof, an iron Carriage Crane and hand Kettles, Chills, Loom Plates, Moulders' iron boxes, &c.

IN PATTERN MAKERS' SHOPS—A large quantity of Patterns, classified and well arranged. IN THE YARDS—From 150 to 200 tons of Moulders' Flasks, Loom Plates, Rings, &c., Plate Bending Machine, wrought iron fly wheel Shaft, Shears and Crab Wrench, with Blocks and Chains, Booms, Scales, and Weights, Iron Crane, with Blocks and Chain, Crab Winches, about 160 feet 18 inches Iron Pipe, and about 100 feet 21 inches ditto, two Boiler Wagons, Cart, and numerous other articles in general use.

There is also an excellent and commodious Dwelling House, comprising Sitting Room, Two Bed Rooms, and Kitchen. Also Offices for Manager, Clerks, and Engineer. There is also a Coke House, Coal Depot, Stables, Coach House, Barn, Lofts, Sheds, &c., and one valuable horse used in the business. The property further comprises 3½ acres of rich Meadow Land adjoining the works. The above premises are held for the remainder of a term of 99 years, determinable on the death of the survivor of three lives, aged respectively about 65, 58, and 17, subject to an annual rent of £25.

The above-described Works are in the midst of the St. Austell clay and mining district, within a mile of St. Austell, and half a mile of Charlestown Harbour, where vessels of 400 or 500 tons burden can be loaded and discharged. The Works are within 200 yards of and on a level with the line of the Cornwall Railway, and afford facilities for a siding.

The said Works can be inspected on any working day between the hours of 10 and 4 P.M.

The purchaser will be required to take all work partly manufactured, and the stock of iron, coal, and other materials on hand at a valuation.

The book debts will be retained by the Vendors. Tenders should be addressed to MICHAEL LOAM, Esq., Parade House, Liskeard, and forwarded not later than the 31st day of May, 1883.

The Vendors do not bind themselves to accept any Tender.

PETERSTONE SUPER MONTM, GLAMORGANSHIRE.

VALUABLE FREEHOLD AND MINERAL LANDS.

MESSESS, STEPHENSON AND ALEXANDER WILL SELL, BY AUCTION, at the Royal Hotel, Cardiff, on Saturday, the 5th May, 1883, at Three for Four o'clock in the afternoon, the following exceedingly VALUABLE FARMS, LANDS, AND MINERALS, viz.:—

First, THE FREEHOLD FARM, called "MAINDY," situated in the hamlet of Peterstone Super Montem, in the parish of Covechurch, Glamorganshire, containing about 233 acres of ARABLE and PASTURE LAND, and now in the occupation of Mr. Thomas David as yearly tenant.

Secondly, THE FREEHOLD FARM, called "TYNYCOED," situated near to the first described Farm, and containing about 48 acres of ARABLE, PASTURE, and WOODLAND, and now in the occupation of Mrs. Eliza Phillips as yearly tenant.

There are excellent Dwelling Houses and commodious outbuildings in good repair on both farms. The lands contain the exceedingly valuable Upper and Lower Seams of Coal, and the Argillaceous Ironstone of the south outcrop of the South Wales Coal Field, and openings have already been driven upon Tynycoed Farm, and the position of some of the upper veins proved. Mining operations are progressing, and are expected to extend rapidly in the locality.

The Ogmore Branch of the Great Western Railway runs near to the properties. The Port of Cardiff is only about fifteen miles distant, the projected docks at Barry and at the Ogmore will be considerably nearer, while the important market town of Bridgend is within six miles.

There is good shooting on the land, and two packs of hounds have their meets in the neighbourhood.

The Tenants will show the Farms.

For further particulars, plans, and conditions of sale, apply to the Auctioneers, Queen's Chambers, Cardiff; or to—

Mr. J. EDWARDS PRICE, Solicitor, Pontypridd.

TO BE SOLD, BY PRIVATE TREATY, the VALUABLE

LEASEHOLD COLLIERY, known as

CEFN MERTHYR COLLIERY,

Situate in the parish of Aberdare, in the County of Glamorgan, comprising the

MOVABLE MACHINERY, ENGINES, BOILERS, TRAMS, GEAR,

AND PLANT.

Recently used thereon, as a going concern, and the RIGHT TO WIN and WORK the respective VEINS or BEAMS of COAL known as the "Two feet nine inch Vein," or "Cornice Coal," and the "Gorllwyn Coal," or "Upper Four Feet Vein," and the Veins or Seams and Beds of Coal and Mines, and Veins of Iron Ore, Ironstone, Fire-claystone, and Blackband lying above a distance of 6 feet above the vein of coal called the "Driver Vein," and under what is usually called the Gorllwyn Top or Rock, and over the said seam of coal called the "Gorllwyn Coal" above the blackband in or under the several pieces or parcels of land, containing together 524 acres and 2 roods, or thereabouts, and which form portions of the several messuages, farms, and lands, commonly called or known by the several names of Tyr Ochor, Llesty Llywydon Tyr, Nantymelyn, and Cefn Gyngon, or some or one of them situate, lying, and being in the parish of Aberdare aforesaid.

The said Mines and Minerals are held under a lease for the residue of a term of 19 years less ten days from the 25th day of March, 1867, created by an indenture of lease dated the 5th day of July, 1871, and made between Frances Crawshaw of the first part, Herbert Kirkhouse of the second part, and the London and Merthyr Steam Coal Company (Limited) of the third part, and are subject to a minimum rental of £400 per annum, and to certain royalties and wayleave rent in the said indenture mentioned.

The purchaser will also be entitled to the benefit of an agreement for a lease of a wayleave over Nantymelyn, dated the 12th May, 1882, and made between Mrs. Margaret Jones of the one part, and John Spencer Tumilty of the other part.

Further particulars may be obtained from Messrs. LANGTON and MACDONALD, Chartered Accountants, 22, Lord-street, Liverpool, and from Messrs. JOHN QUINN and SONS, Solicitors, 22, Lord-street, Liverpool.

STEAM BOILERS FOR SALE, SECONDHAND, with and

without Galloway Tubes, single and double rivetted, working pressure of 60 lbs., 65 lbs., 70 lbs., and 80 lbs. steam pressure. VERY CHEAP.

FIVE BOILERS, 30 feet by 7 feet 6 inches diameter, excellent order.

SIX BOILERS, 30 feet by 7 feet 6 inches diameter, " " " "

FOUR BOILERS, 28 feet by 7 feet " " " "

THREE BOILERS, 28 feet by 7 feet " " " "

FOUR BOILERS, 24 ft. by 6 ft. 6 in. " " " "

And other sizes in stock. Equal to new.

WINDING ENGINES and COLLIERY PLANT of every description, second-hand, in stock. VERY CHEAP. Write to—

H. HELLERWELL and CO., 4, NORTH CORRIDOR ROYAL EXCHANGE, MANCHESTER.

TIN MINES.

TWO VERY VALUABLE TIN PROPERTIES IN DURANGO, MEXICO, FOR SALE. They contain extensive placers of Stream Tin, yielding heavily, the Benoxide being very pure, and also several fissure veins yielding from 15 to 50 per cent. Metallic Tin.

For further particulars, address to JOHN ROBERTSON, M.E., Las Vegas, New Mexico, U.S.A.

TO CAPITALISTS, PROMOTERS OF PUBLIC COMPANIES AND OTHERS.

FOR SALE, BY PRIVATE TREATY, the LEASE of an EXTENSIVE COAL and LIMESTONE ROYALTY in the County of Durham, well situated, and in proximity to a railway.

For particulars and report of same by an eminent engineer, apply to Messrs. JOEL and SONS, Auctioneers and Valuers, 87 and 89, Pilgrim-street, Newcastle-upon-Tyne.

TO IRONMASTERS, CAPITALISTS, AND OTHERS.

VALUABLE PROPERTY FOR SALE,

Situate near Newtowncrommelin, in the County of Antrim, consisting of a

TRAMWAY OR RAILWAY FOR THE CARRIAGE OF MINERALS.

TO BE SOLD (under the power of Sale in a Mortgage), BY PUBLIC AUCTION, at the Auction Mart of Messrs. WILLIAM MONTGOMERY and SON, Lombard-street, Belfast, on Friday, the 4th day of May, 1883, at the hour of One o'clock, in One Lot:—

1.—All those several PIECES or PARCELS of LAND, being part of the lands of Cargan, Legagrane, and Evishacrow, in the Barony of Killybegny, and County of Antrim, containing 4 A. 2 R. and 1 P. statute measure.

2.—All those several PIECES or PARCELS of LAND, part of the land of Tuftarny, in said Barony and County, containing 1 A. 1 R. and 26 P. statute measure.

3.—All that PIECE or PARCEL of LAND, being part of the said lands of Cargan, containing 2 P. statute measure, all held in fee simple, together with the rails, sleepers, points, gates, bridges, fences, drains, crossings, engine shed, houses, drum or hoist drum house, wire ropes, runners, and all other the fixtures and other property upon said lands.

DESCRIPTIVE PARTICULARS.

The property to be sold comprises the several parcels of land above mentioned, upon which there has been constructed a railway, laid with steel rails of about 54 lbs. to the yard. The line has been laid in the best manner, and properly bridged and drained, and gives communication from the townlands of Tuftarny, Legagrane, Skerry East, and neighbouring townlands, being an extensive district, rich in iron ore, and in which large and profitable mining operations are being carried on to the Ballymena, Cushendall, and Redbay Railway, by means of which line minerals can be carried and laid down for shipment on the quays of Belfast and Larne.

The property is completely fenced in, and there is a large engine-house and dwelling-house suitable for a caretaker on the land. At one portion of the line there is a considerable incline which is worked by means of a double wire rope and drum. The whole property is in complete working order, and has been quite recently used for the transit of iron ore by the Crommelin Iron Ore Company.

The nearest railway station to this railway is at Ballymena.

The abstract of title and conditions of sale under and subject to which the property will be sold may be seen at the offices of the under-mentioned solicitors for the vendors at Belfast.

For further particulars, apply to—

Messrs. M'GRIGOR, DONALD, and COMPANY, Solicitors, 172, St. Vincent-street, Glasgow.

Messrs. CHORLEIGH and SON, Solicitors for the Vendors, 22, Lombard-street, Belfast, and Bustace-Street Buildings, Dublin.

WILLIAM MONTGOMERY and SON, Auctioneers, Lombard-street, Belfast.

THE EAST PANT DU LEAD MINING COMPANY

(LIMITED).

THE VALUABLE LEASEHOLD PREMISES, known as EAST

PANT DU MINE, situate in the parish of Nerquis, in the

county of Flint, is OFFERED FOR SALE.

For particulars, apply to JOHN ASHWORTH, 8, King-street, Manchester.

ON SALE.—FOUR LANCASHIRE BOILERS, 30 feet by

7 feet. Shells double rivetted, and Bowling expansion rings in flues.

THREE ditto, 30 feet by 7 feet, with plain flues.

THREE ditto, 30 feet by 7 feet 3 inches, with six Galloway tubes in each flue.

THREE ditto, 26 feet by 7 feet, with four Galloway tubes in each flue.

EDWARD RATCLIFFE, HAWARDEN, NEAR CHESTER.

ON SALE.—THREE LANCASHIRE BOILERS, 32 feet by

6 feet 9 inches; now working at 70 lbs. under Insurance, near

Manchester. Cheap if taken at once.

EDWARD RATCLIFFE, HAWARDEN, NEAR CHESTER.

FOR SALE, a 30 H.P. PORTABLE STEAM ENGINE has

link-motion reversing gear, with winding and pumping gear complete.

A 16 H.P. PORTABLE WINDING AND PUMPING ENGINE

Also a 6 H.P. PORTABLE HOISTING-ENGINE.

To be seen at—

BARROWS AND STEWART'S WORKS, BANBURY, OXON.

METALLURGICAL DEPARTMENT, KING'S COLLEGE,

LONDON.

Under the direction of PROF. A. K. HUNTINGTON.

In the Laboratory, Extraction and Manufacturing Processes are investigated, Assays and Analyses made, and Metals and Alloys are examined, with the aid of powerful Testing Machinery, as well as Chemically.

A FEW FREE ENTRIES to the DIVISION OF STUDIES (day or evening) are obtainable through the CITY AND GUILDS' INSTITUTE.

MASON AND BARRY (LIMITED).

(SAN DOMINGOS MINE, PORTUGAL.)

Notice is hereby given, that the FIFTH ANNUAL ORDINARY GENERAL MEETING of the members of Mason and Barry (Limited) will be HELD at the Cannon-street Hotel, London, E.C., on THURSDAY, the 10th May, at Two o'clock precisely.

For the purpose of receiving the directors' report for the year 1882; approving the general balance-sheet at 31st December, 1882; declaring a final dividend for the year 1882; the re-election or appointment of directors; and the appointment of auditors.

The holders of Share Warrants to bearer will be furnished with a card of admission to the meeting upon their depositing Share Warrants representing not less than ten shares at the office of the company three days before the meeting, together with a notice in writing stating their names, residences, and occupations or descriptions.

The Transfer Books of the company will be closed from Thursday, the 26th April, to Wednesday, the 9th May, both days inclusive.

By order of the Board,

JOHN G. BARRY, F.C.A., Secretary.

57, Cannon-street, London, E.C., 25th April, 1883.

MINE "EL CUALLO,"

GUAYANA, VENEZUELA.

COUPONS OF SHARES 322

Gold in bars produced in the month of March, 1883, and re-

mitted to Messrs. Baring Brothers and Co., London, 8536-63 ozs.

DIVIDEND distributed for each coupon, \$250.

(Signed) A. LICCIONI, President.

(Signed) VICTOR T. GRILLET, Treasurer.

J. S. MERRY,

ASSAYER AND ANALYTICAL CHEMIST,

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ALEX. DEL MAR,

Mining Engineer, late Director of the United States Bureau of Statist

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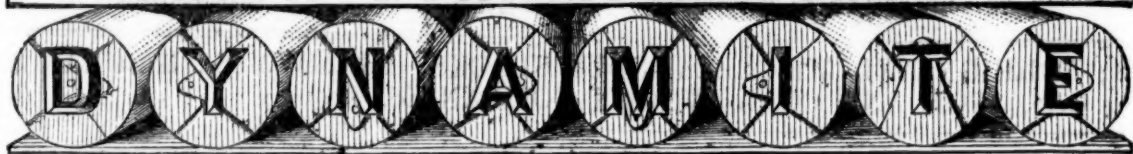
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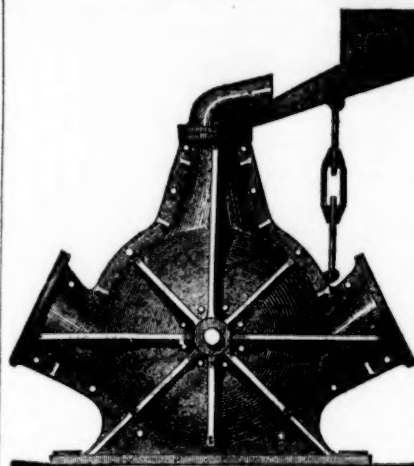
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NON-DIVIDEND MINES—continued.

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25000	North Grogwinton, * s, Cardighr..	1	0	0
18000	North Horsfield, s, Liskeard.....	0	12	6
20000	North Looe, * s, m, s, Devor.....	1	0	0
8000	North Penrith, * s, c, Gwennap.....	2	10	0
2936	North Trekerby, c, St. Agnes.....	1	0	0
8000	Northern, * s, i, Durham.....	8	17	10
49000	Okel Tor, * t, c, d, Calstock.....	1	0	0
30000	Old Shepherds * s, i, Cornwall.....	1	0	0
60000	Owen Veal & Trogur, * c, s, Marazion	1	0	0
12000	Pandora, * s, i, Carnarvon.....	2	0	0
50000	Parya Corporation, * c, Anglesea.....	1	0	0
7500	Pateley Bridge, i, Yorkshire.....	1	0	0
8000	Pedn-an-drea, t, Redruth.....	3	15	0
12000	Pelyn Wood, c, Llanvory.....	0	2	0
20000	Pennant, i, bar, North Wales.....	5	0	0
20000	Pence, * s, i, c, North Wales.....	1	0	0
12000	Pen-y-Orndd, * s, i, Flintshire.....	1	0	0
15000	Perran Consols, * s, i.....	1	0	0
12000	Perran Wheal Alfred, c.....	0	2	6
2000	Polebreto, t, Crowan.....	1	10	6
10000	Polroze, t, Cornwall.....	1	5	0
10000	Port Nigel Sign, * s, i, Carnar. (4000 is.)	1	15	0
20000	Portreath, * s, i, c, St. Agnes.....	1	0	0
12000	Prince of Wales, c, Calstock.....	1	2	0
38000	Russell United, * c, Tavistock.....	9	15	6
30000	Silver Hill, i, Callington.....	1	0	0
50000	Sinclair, * i, b, Whitford.....	1	0	0
40000	St. Austrey, * s, i, c, Exeter.....	1	0	0
8000	South Carlisle, c, Redruth.....	0	10	0
42000	So. Devon Unit, * c, Buckfastleigh.	1	0	0
8000	South Dolcoath, * s, i, Illogan.....	0	19	0
8000	South Penrith, * s, c, Gwennap.....	2	19	6
6000	South Tolcarne, t, c, Camborne.....	5	11	6
2434	South Wheal Croffy, c, Illogan.....	3	19	6
6500	South Wheal Frances, t, Illogan.....	9	14	7
40000	St. Austrey, * s, i, c, Exeter.....	1	0	0
110000	Tankerville City Consols.....	1	0	0
12000	Trebratna Lemanor, t, Northall.....	1	0	0
6000	Trengemto, t, c, Cornwall.....	3	10	0
50,000	Trengreates and Old Polgooth Con..	1	0	0
100000	Tresavean, * t, c, Gwennap.....	1	0	0
50000	Trevarren United, * t, Cornwall.....	1	0	0

Evandale, t, St. Agnes	0	3	0...	2
ughan,* t, Cardiganshire.....	10	0	0...	—

8000	Victor, * t, Clifton, Flintshire	0	14	0	—	—	—
2000	Violet Seton, c, Camborne	12	0	0	6	—	—
15000	Vincent, * t, Altarnun	1	0	0	—	—	—
12000	West Assheton, t, Carnarvon	1	0	0	—	—	—
12000	West Caradon, c, St. Cleer	0	7	9	—	—	—
3000	W. Craven Moor, c, Pateley Bridge† ..	10	6	0	—	—	—
1000	W. Crabro, c, Tavistock	1	0	0	—	—	—
10240	West Devon Consols, c, Calstock	1	2	0	—	—	—
10000	West Godolphin, t, c, Breage	1	2	6	—	—	—
20000	West Lisburne, * t, Cardigan	1	0	0	1	—	—
3000	West Mary Ann, t, Menheniot	1	13	0	—	—	—
20070	W. Pateley Bridge, t, Yorkshire	1	1	0	—	—	—
12000	West Phoenix, t, Linkinhorne	1	0	6	13½	1	13½
6000	West Polbarn, c, t, St. Agnes	0	5	6	—	—	—
5100	W. Poldice, St. c, Redruth	1	1	—	1½	—	1½
512	West Pough, c, Redruth	99	0	0	12	—	10
2048	West Wheal Frances, t, Illogan†	35	18	3	—	—	—
3000	West Wheal Peevor, t, Redruth	3	0	6	5½	5	5½
2400	West Wheel Seton, c, Camborne†	15	0	0	15	14	10
6000	Wheal Agar, c, Illogan†	16	6	0	15½	14½	15
6144	Wheal Bassett, c, Illogan†	7	9	0	6	5½	—
3000	Wheal Basset, t, Redruth	1	3	6	1	—	—
15000	Wheal Basset, t, St. Just	1	3	6	15½	15½	14
2000	Wheal Coates, t, St. Agnes	0	7	0	—	—	—
2585	W. Conf., & No. Tres., t, c, Gwennap ..	2	2	0	—	—	—
50000	Wheal Elizabeth, * t, Cornwall	1	0	0	—	—	—
15000	Wheal George, * t, bl, Carnarvon	1	0	0	—	—	—
12238	Wheal Jane, t, Kea†	2	4	0	—	—	—
12000	Wheal Jewell, c, St. Hilary	2	6	0	—	—	—
25000	W. Hon. c, t, St. Hilary, c, t, Lisk	2	0	0	—	—	—
12000	Wheal Lasky, t, Callington	0	3	0	—	—	—
20000	Wheal Coates, t, St. Agnes	7	3	0	—	—	—
30000	Wheal Owles, t, St. Just†	7	3	0	8	—	—
6000	Wh. Silver & Lanteglos, * t, c, Camelfid ..	1	0	0	—	—	—
4000	Wheal Sisters, t, Lelant	3	10	0	13½	1	13½
4096	Wheal Uny, t, c, Redruth	16	19	8	3½	3	—
60000	Yeoland Consols, * t, Devonshire	0	12	6	1	—	—
4000	Ystwith, t, Cardigan	1	0	0	—	—	—

bl, blende; c, copper; g, gold; l, lead; s, silver; sl, slate;
 sl, silver-lead; t, tin; z, zinc; i, iron; a, arsenic.

* Limited Liability Companies; † quoted on the Stock Exchange
 † have paid dividends.

GAS COMPANIES.

Issue, Shares.		Pd.	Clos. pr.
5000	20..Bahia [L]	all..	21 22
510000	5	all..	6 6½
1800	5	all..	4 ½
27300	5	all..	4 ½
14000	20..British	all..	39 41
50000	5Stk	100..	209 213
20000	20..Continental Union [L]	all..	23 29
20000	20..Do. do. New, 1859, 1872	all..	19½ 20
10000	20..Do. do. 7 per ct. Preference	all..	27 28
5400	10..European [L]	all..	17 20
54300	5	all..	101 102
242200	5Stk	100..	104 107
5000	10..Hong Kong and China	all..	16 17
2800000	5Stk	100..	204 207
385500	5	all..	210 215
12000	5	all..	2½ 2½
100000	5	all..	14 15
10000	5	all..	13½ 14
10000	5	all..	7½ 7½
27500	20..Rio de Janeiro [L]	all..	23½ 24½
500000	5Stk	100..	218 223

TRAMWAYS

Issue, Shares,		PL. Clas. pr.
40000	5 Anglo-Argentine [L]	10 5 1/2
10000	10 Barcelona [L]	10 5 1/2
7140	10 Belfast Street Tramways	all 7 1/2
3050	10 Birkenhead, Ordinary	all 7 1/2
3000	10 Ditto, 6 per cent. Preference. all ..	7 1/2
9250	10 Bristol [L]	10 10 1/2
25000	10 Bordeaux Tram & Omnibus [L] ..	10 10 1/2
3200	10 Chester [L]	all ..
24000	10 Dublin	all 9 10
14690	10 Edinburgh Street Tramways	all 11 10 1/2
35000	10 Glasgow Tramway & Omnib. [L] ..	9 15 10 1/2
10000	10 Hughes Loco. and Tram. works. all ..	5 10 1/2
7500	10 Hull Street Tramways	all 10 1/2
7500	10 Imperial [L]	all 10 1/2
25000	10 Leeds & Thos. Street [L]	all 14 10 1/2
25000	10 London [L]	all 14 10 1/2
15000	10 London Street Tramways	all 17 17 1/2
60000	10 North Metropolitan	all 17 17 1/2
8000	10 Nottingham and District [L]	all 5 10 1/2
15847	10 Provincial [L]	all 5 10 1/2
6000	10 Sheffield	all 5 10 1/2
5000	10 Southampton	all 5 10 1/2
5000	10 Swansea [L]	all 5 10 1/2
5000	10 Swansea [L]	all 5 10 1/2
12000	10 Tramways of France [L]	all 10 10 1/2
16500	10 Tramways of Germany [L]	all 10 10 1/2
40000	5 Tramways and Gen. Works [L]	all 5 10 1/2
40000	5 Tramways Union [L]	all 5 10 1/2
25000	10 Vale of Clyde	all 5 10 1/2
7200	10 Wolverhampton [L]	all 5 10 1/2

BANKS.

Stations.	Per.	Clos. pr.
Stk. Anglo-American	100 0	51 52
10 Brazilian Submarine	10 0	12 1/2 12 1/2
10 Cuba	10 0	12 1/2 10 1/2
10 Direct Spanish	9 0	5 1/2 5 1/2
20 Direct United States Cable ...	25 0	10 1/2 11 1/2
10 Eastern	10 0	12 12 1/2
10 East, Exten. Austr. and China	10 0	10 10 1/2
10 German Union	10 0	12 1/2 12 1/2
10 Northern	10 0	12 1/2 12 1/2
10 Indo-European	25 0	3 1/2 4
25 London Platino Brazilian	10 0	4 1/2 4 1/2

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